

Operator's Manual



DECISION DATA
COMPUTER CORPORATION

**A Guide to the Operation of
8001 DATA RECORDER
8010 INTERPRETING DATA RECORDER**

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DECISION DATA

DATA RECORDER OPERATOR'S MANUAL

This manual is a comprehensive guide to the operation of the 80 column data recorders manufactured by Decision Data: the 8001 Data Recorder and the 8010 Interpreting Data Recorder. It is a basic reference to be used by all levels of personnel. The first chapter provides a description of the 8001 and 8010 Data Recorders and an overview of the functions. It also introduces the basic 80 column card format and information coding, which should be of particular assistance to those individuals who have no prior keypunching experience.

Since all data recorders built by Decision Data have been specifically designed with the operator in mind, we are confident that in a short time you will prefer the Decision Data units over any keypunches or verifiers that you have used in the past. Each of our machines will allow you to operate at maximum speed and efficiency. You will find that you will make fewer errors, encounter fewer delays and that, overall, the Decision Data machines are easier to operate.

If you have any questions about the operation of Decision Data machines after reading this manual, please ask your Decision Data Customer Representative. He will be most happy to assist you.

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8001 Data Recorder
8010 Interpreting Data Recorder

The ultimate in Data Recorder performance and operator convenience.

1/GENERAL DESCRIPTION

80 COLUMN DATA RECORDERS

Decision Data Computer Corporation manufactures two 80 column Data Recorders.

The 8001 Data Recorder can be used to keypunch, verify, gangpunch, interfile and reproduce 80 column cards.

The 8010 Interpreting data Recorder has the same capabilities as the 8001 plus the additional features of printing and interpreting.

Both the Data Recorders are *programmable*. Four standard program levels and a special PRINT EDIT memory are available to the user to store individual programs. Programs provide the user with the ability to automatically control such functions as data formatting, duplicating, punch suppressing, skipping and print editing (8010).

After program cards have been prepared, they are read into selected program storage areas to enable the operator to select a program to assist in controlling the format for keying, punching and/or printing (8010).

For a general description of the Data Recorder operations, assume the operator has set the mode control to the PUNCH mode of operation to keypunch a specific job assignment using the 8010 Interpreting Data Recorder. The operator selects the stored program to be used and keypunching begins under program control.

A blank card is fed into the visible wait station of the Data Recorder and the column indicator visually displays the number of the first column to be keyed. The operator keys each character into electronic memory and the data is stored until an entire card image has been completed. The card is then moved into the punch/print station and is punched and printed with the data stored in electronic memory. The Data recorder then releases the completed card into an output stacker and another blank card is fed into the visible wait station. Electronic storage is immediately available for keying the next card while the previous card is being punched and printed.

Since data is stored in electronic memory before it is punched and printed into a card, operator sensed keying errors can be easily rekeyed prior to actual punching of the card.

After the cards have been keypunched, it is often necessary to verify them. Verification is a key mode operation, similar to keypunching and is performed to check the accuracy of the cards that have been keypunched.

In most instances, the same program that was used to keypunch the cards can also be used to verify them. For a general description of the verification process, assume the operator has set the mode control switch to VERIFY using the same program as used in PUNCH mode. The punched cards are placed in the primary hopper. A supply of blank cards is placed in the secondary hopper to permit the Data Recorder to automatically make a new card when an incorrectly punched card is detected during verification.

A punched card is fed through the read station where each column is read into electronic memory; the card stops in the visible wait station and key verification begins. As the operator keys each column, the Data Recorder compares the operator's keystrokes with the data stored in electronic memory. If the comparison for each column is correct, the Data Recorder moves the punched card into the punch/print station where it is punched with *two verify correct* punches. The card is then released to the first output stacker.

When an error is detected in the stored data, the operator keys the correct data into electronic memory and completes verification for that card image. The Data Recorder then moves the incorrectly punched card from the wait station and releases it to the second output stacker, thereby separating it from the *verify correct* cards. At the same time, a blank card is fed from the secondary hopper into the punch/print station. The Data Recorder automatically makes a new card by punching and printing (8010) the blank card with the corrected card image stored in electronic memory. The card is also punched with *one verify correct* punch and released to the first output stacker to maintain file sequence of the cards verified.

Verification can continue for the next punched card as soon as it has been fed into the visible wait station.

In addition to the operational overview above, this chapter also provides a general description of the features which are *standard* on the 8001 and 8010 Data Recorders. The *Auxiliary functions* which can be operated on the 8001 and 8010 are presented in Chapter 5. The *Optional Features* for both the 8001 and 8010 Data Recorders are described in Chapter 7.

STANDARD FEATURES

The 8001 and 8010 provide the user with a number of standard features, some of which are unique, to enable operators to achieve new levels in card production.

Movable 64 Character Keyboard

The *keyboard* is connected by a cable to the operator panel. This allows the operator to adjust its position for convenience and comfort. There are 3 keyboard switches, 19 function keys, and 35 data keys. The data keys contain 64 different characters. An audible feedback is provided to the operator for each successful keystroke. As each key is depressed, a *click* sound tells the operator that the keystroke was entered into buffer memory. If not heard, the operator will know to restroke. Color coding is used to differentiate data keys from function keys. The home keys, A, S, D, F, J, K, and L are deeper in depth to provide a sense of touch which differentiates them from the other rows of keys.

Backspace

The *backspace* key permits the operator to backspace one column at a time or to backspace continuously, column-by-column, until the first column of the field, or card is reached.

Right Adjust

The RIGHT ADJUST key is used to shift the data (usually numeric) in a partially filled field to the rightmost column(s) of the field. e.g. A field consists of columns 1-12. The sum 829 for instance, is keypunched in columns 1-3 of the field. When the RIGHT ADJUST key is depressed, the Data Recorder automatically shifts the number into columns 10-12 of the field thereby right adjusting the data into the rightmost columns of the field.

-RA

The MINUS RIGHT ADJUST key is used to cause the same action as the RIGHT ADJUST key, but indicates a negative number amount field.

Input Hoppers

Two *input hoppers* are provided. The primary hopper has the capacity to hold 600 cards and is used to hold blank cards or punched cards. The secondary hopper has the capacity to hold 400 cards and is used to hold blank cards. The HOPPER indicator will light when a card does not arrive at the read station within a specified period of time once a card feed has been initiated. This alerts the operator to an empty hopper condition or a card mis-feed from the hopper.

Output Stackers

Two *output stackers* with a capacity to hold 400 cards each are provided. Stacker 1 is normally used for single file operations and stacker 2 is normally used for error cards and program cards. Cards are stacked, face forward, in proper ascending file sequence. When either stacker becomes full, the STACKER indicator will light to alert the operator to remove the cards from the full stacker.

Data Recorder Desk

The movable keyboard can be adjusted on the spacious *desk top* for maximum comfort and convenience while providing sufficient work space for documents from which cards are punched.

Visible Wait Station

The 80 column card moves into the *visible wait station* after it has been released from the input hopper and read by the Data Recorder. The face of the card is almost totally visible to the operator when performing any Data Recorder function.

Four Program Levels

The Data Recorder is a programmable machine and provides *four standard program storage areas* for programs prepared by the operator. A job may require the use of one program storage area or all of them. Four additional

program levels are available as an option. *See Chapter 7.*

Print Edit (8010)

This unique feature permits the operator, under program control, to edit the data to be printed on a card. A special memory area has been set aside to store *PRINT EDIT* programs. *See Chapter 3.*

Punch Suppress (8010)

A special program area is provided for specifying columns in which it is desired to *suppress punching* but still permit printing at the top of the card for the suppressed columns. *See Chapter 3.*

Blank Card Interfiling

This operation permits the operator to produce a deck of cards with a *blank card automatically interfiled* behind each card. *See Chapter 5.*

File Reproduction

This operation permits the operator to *reproduce a card file* automatically. *There are several variations of card reproduction as described in Chapter 5.*

Interpreting (8010)

This feature permits *interpreting of pre-punched data*. As the punches are read, the data is interpreted and printed along the top edge of the card which correspond to the punched columns below. *See Chapter 5.*

80 Column Card

An understanding of the *80 column card* format and how information is coded in the card is necessary to fully master the operation of the Decision Data 8001 and 8010 Data Recorders. This section describes the 80 column card and the way data is recorded (punched or printed) on it by the 8001 or 8010 Data Recorder.

Card Format and Information Coding

Figure 1-1 shows an 80 column card. The card consists of 80 individual columns; each containing twelve rows or punch positions. The 80 column card can have 80 characters punched into it.

80 Column Card Terms

A special vocabulary has evolved to provide communication terms for those people working with the 80 column card and the Data Recorder. Some of the more common terms and their definitions, as used in this manual, are presented in Figure 1.2.

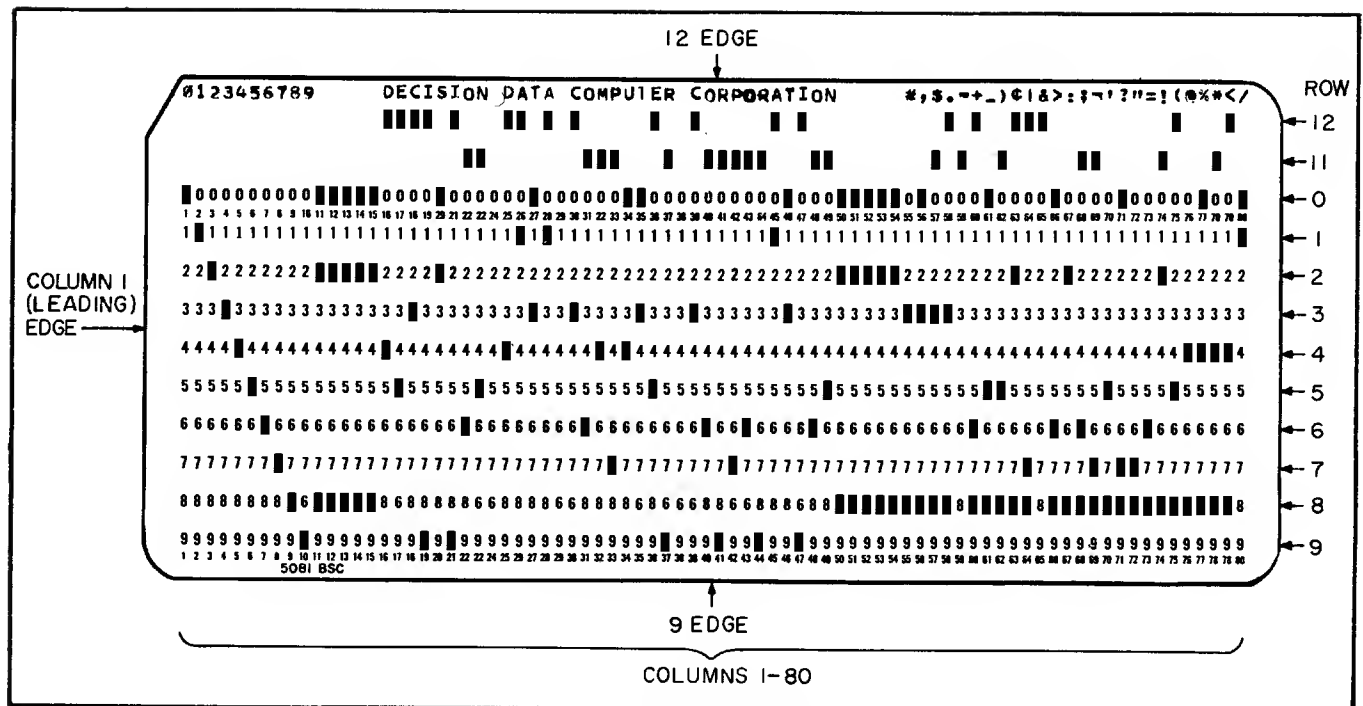


Figure 1.1. 80-Column Card

TERM	DEFINITION
RECORD OR UNIT RECORD:	A card which contains data relevant to <i>one</i> complete segment of information. (i.e., A punched card containing employee's time card data for payroll information. A record would contain the date, the employee's name, the department number, and the number of hours worked each day).
FIELD:	The portion of a record which contains a specific item of information or a group of information. (i.e., The date = a field; the employee's name = a field; the department number = a field, etc.).
COLUMN:	The individual position within a record that contains one character of punched data. (i.e., The date; each digit of the date represents one column of data).
BIT:	One of the 12 possible punch positions within a column. The character in a card column is represented by a combination of bits (punches) commonly called a code. (i.e., The letter "A" is the combination of bits (punches) 12 and 1. Figure 1.3 illustrates the bit (punch) positions for numeric, alphabetic and special characters. Chapter 3, Figure 3.3 provides a definition of the punch code functions.
LEADING EDGE:	The left edge of the card (column 1) when it is face up.
DUP:	Automatic entry of duplicate data.
SKIP:	Fast spacing which means the automatic entry of blanks.

Figure 1.2. 80-Column Card Vocabulary

2/FUNCTIONAL SECTIONS

The Data Recorder consists of four functional sections: the Electronics, the Mechanical Mechanism, the Operator Panel and the Keyboard. This chapter provides a description of each functional section and its respective location for operator reference.

ELECTRONICS CABINET

The electronic circuitry controls the operation of the Data Recorder and is located, for the most part, in the cabinet below the table top. It consists of the power supply, wiring, and logic control circuits. Three items of interest on the electronics cabinet are shown in *Figure 2-1*; power ON/OFF switch, circuit breaker and chip box.

ON/OFF Switch

This switch is pressed ON or OFF to apply power to, or remove power from, the Data Recorder. When the power

switch is moved from the OFF position to the ON position, a general *clear signal* will clear the logic and clear all memory areas to blank. If the program control switch is in the PROG position, program level 1 will be selected for storing of data and the keyboard will be set to UPPER SHIFT.

Circuit Breaker

A circuit breaker is located on the front cover to the left of the power switch. In the event the Data Recorder loses all power and the power switch is ON, the circuit breaker switch is pressed to restore the power.

Chip Box

Punched chad (or chips) from the cards fall into the chip box. Under average conditions the chip box holds the chad from one week of card punching. It should be emptied, however, as frequently as the Data Recorder usage dictates.

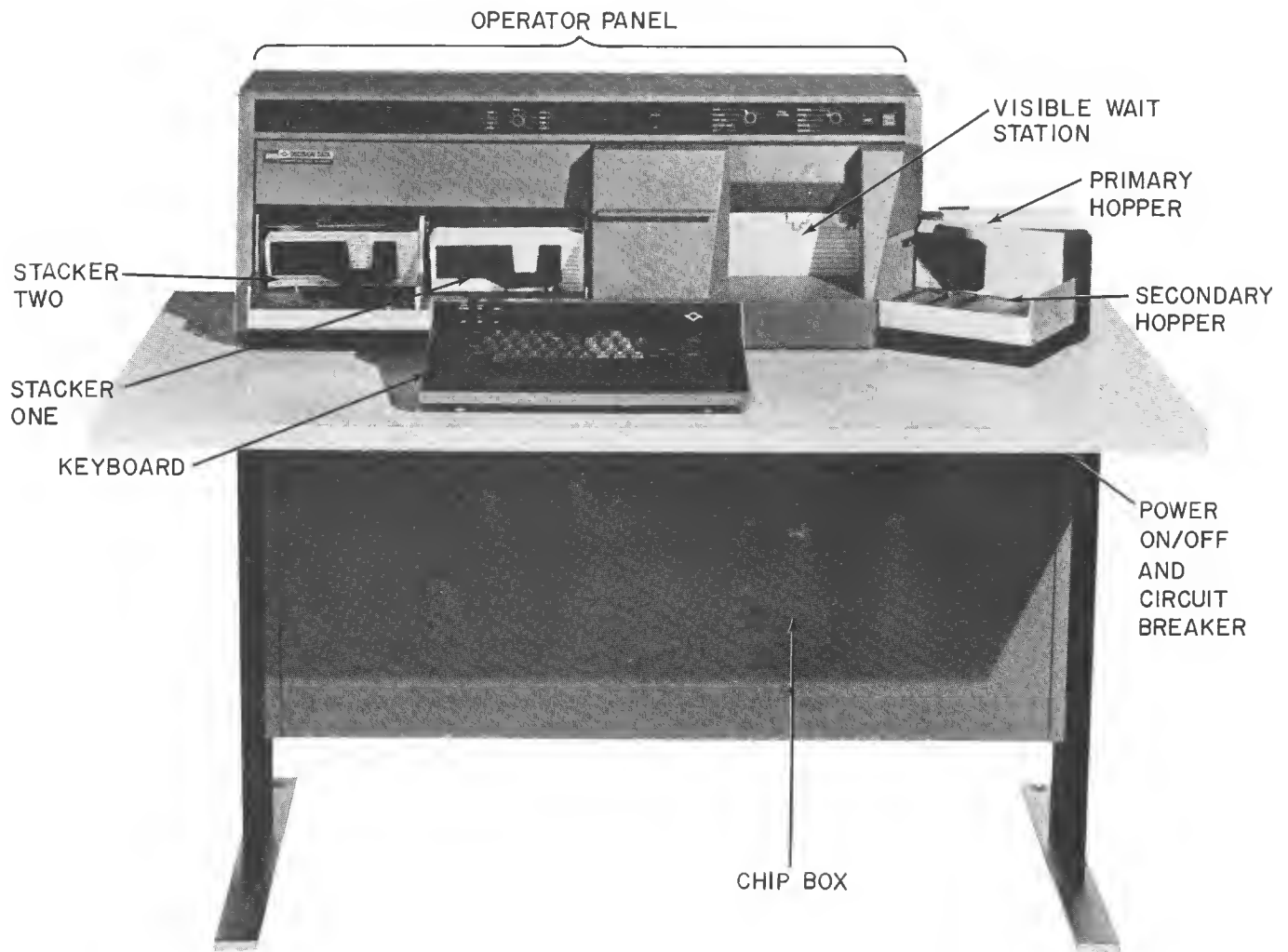


Figure 2.1. 8010 Interpreting Data Recorder

MECHANISM

The mechanism is comprised of the electromechanical functional parts that are necessary for data recording: two input hoppers, a read station, a visible wait station, a punch station, a print station (8010), two output stackers and a card transport system. See Figure 2-2.

Two Input Hoppers

The input consists of a primary hopper which holds 600 cards and a secondary hopper which holds 400 cards. A hopper should not be loaded when cards are feeding from it. Cards are placed in either hopper, face forward, with the column 1 edge to the left. The front card is always the first to feed from the primary hopper and the rear card is always the first to feed from the secondary hopper.

Read Station

When Data Recorder operations begin, a card selected from one of the hoppers automatically moves through the read station where it is read column-by-column.

Visible Wait Station

After the card is read, it waits in the visible station where almost all of the card surface is visible to the operator. The keying operation begins. As the operator keys data on the keyboard, it is stored in memory.

Punch Station

When keying is completed, the card is released into the punch station for punching.

During PUNCH operations, the card advances through the punch station two columns at a time. The card slews over fields that are not punched.

During VERIFY operations, the card moves through the punch station as far as column 81. The Verify punch is added into column 81. See Figure 3-7.

Print Station

The card moves from the punch station into the print station for printing (8010). All characters are printed along the top of the card; each character represents the data punched in the card column directly below it.

Two Output Stackers

The Data Recorder releases the cards into the stackers face forward. There are two output stackers: Stacker 1 is normally used for single file operations; stacker 2 for error cards and program cards. When either stacker becomes full, the STACKER indicator lights on the operator panel. See Chapter 6, *Operator Recovery Procedures*.

Note: Cards should never be removed from the stackers while cards are being fed from the input hoppers.

*Under certain conditions, the two stackers are capable of operating in an overflow manner: When stacker 1 is full, cards will automatically feed into stacker 2. See Chapter 4, *Stacker Overflow*.*

Card Transport System

The card transport system moves each card through the mechanism. The card transport drive motor turns off when the indicators STACKER or FEED CHECK light (see Chapter 6, *Operator Recovery Procedures*) or when the keyboard has not been used for approximately 20 seconds. The transport motor drive automatically turns on again when the STACKER or FEED CHECK condition is corrected and the START switch is pressed, or when operations resume at the keyboard.

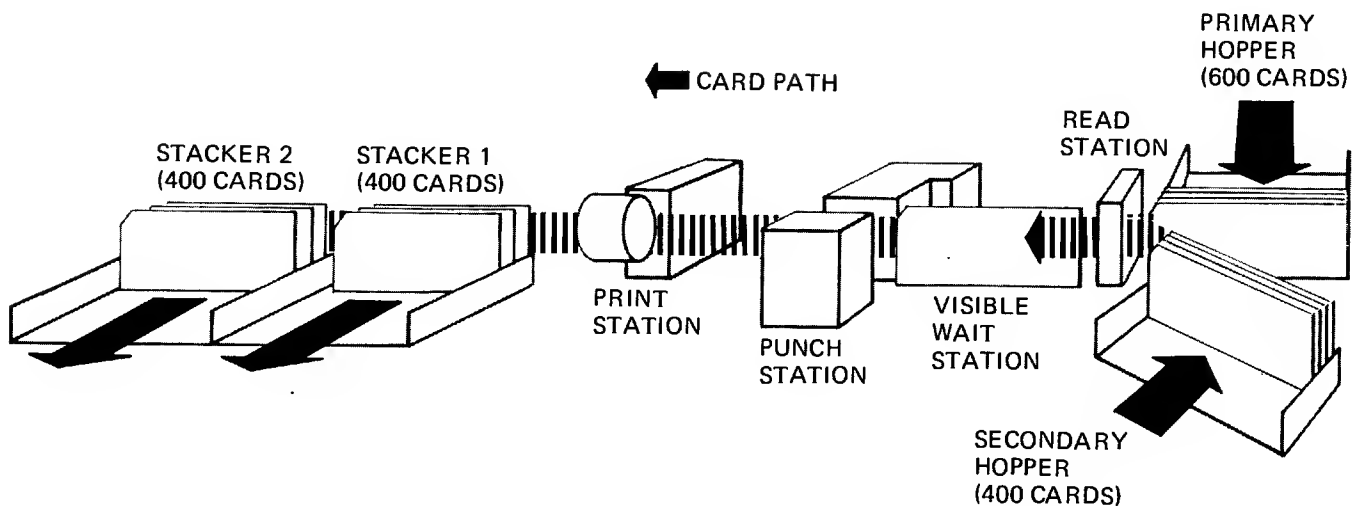


Figure 2.2. Mechanism Schematic

OPERATOR PANEL

This section describes the switches and indicators which control most of the major operations of the Data Recorder. *Figure 2-3 illustrates the location of the various switches and indicators.*

Stop/Reset Switch

This switch serves two purposes: It resets error indicators which light on the operator panel and stops the automatic feeding of cards when the mode switch has been set for REPRODUCE or INTERPRET.

Start Switch

This switch is primarily used to start PROG LOAD, REPRODUCE, INTERPRET or INTERSPERSED GANG PUNCH and INTERPRET operations. It also serves the purposes of: 1) Contributing to operating the stackers in an *overflow* manner, and 2) to operating the input hoppers in a *hopper reverse* condition: See *Chapter 4, Stacker Overflow and Hopper Reverse*. In addition it is used to initiate the ON-LINE mode. See *Chapter 7, Interface*.

Mode Control Switch

This rotary dial mode switch is used to select one of five modes of operation, as listed below. A second purpose is to cause a *mode clear*. See *Chapter 4, Mode Clear*.

PROG LOAD

Program Load is used when a program control card is to be read into a selected program storage area.

PUNCH

This mode is used to perform keypunching.

VERIFY

This mode is used to verify keypunched cards.

REPRODUCE

This mode is used when a card file is to be reproduced.

INTERPRET (8010)

This mode is used when pre-punched cards are to be printed.

Punch Suppress Switch (8010)

This spring-return toggle switch activates a PUNCH SUPPRESS program previously loaded into a program memory 4 when the program control switch on the keyboard is in the PROG position. The PUNCH SUPPRESS indicator will light and punching of cards is prevented on a column-by-column basis depending on the program control.

Print Control Switch (8010)

This rotary dial switch contains five dial positions and is used to select a type of print control.

PRINT

This position is effective during the PUNCH, VERIFY (remade cards), REPRODUCE and INTERPRET modes of operation. When the PRINT position is set, the top of the card is printed with the characters as punched in the associated card columns below.

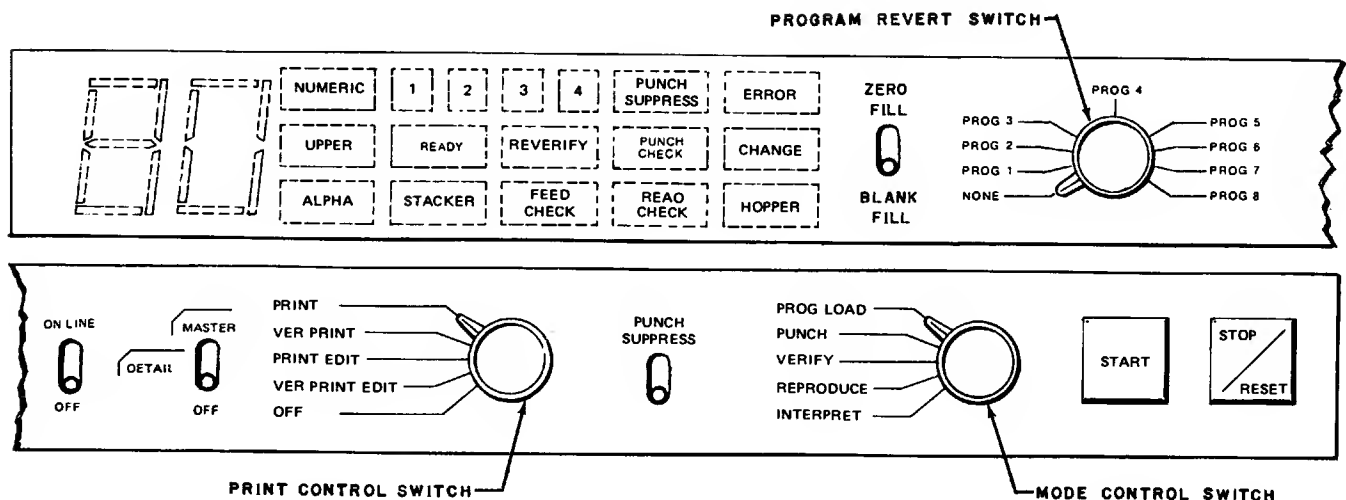


Figure 2.3. 8001, 8010 Operator Panel

VER PRINT

The Verify Print is selected when key verifying unprinted cards. Data punched or verified by the Data Recorder is printed on the upper portion of the card with the characters as punched in the associated card columns below.

PRINT EDIT

When a PRINT EDIT program has been loaded into program storage, this position is selected to control printing on a column-by-column basis.

VER PRINT EDIT

The Verify Print Edit position performs the same function as PRINT EDIT when key verifying unprinted cards.

OFF

This position is selected to prevent printing on cards.

Master/Detail Switch (Optional Feature 8001, 8010)

This switch is used to activate the *Interspersed feature*. See Chapter 7 for a description of this feature.

On-Line Switch (Optional Feature 8001, 8010)

This toggle switch connects the Data Recorder to a computer interface and is activated by pushing the switch to an up (ON-LINE) position. When it is OFF, the Data Recorder functions as a stand-alone machine.

Program Revert Switch

This rotary switch selects program levels 1 through 8 (5 thru 8 are optional) and includes a NONE position. When this switch is set to a program number (level) and the "program control" switch on the keyboard is in the PROG position, the program level selection will revert to the program originally selected by the program revert switch whenever a card release function occurs.

The program revert switch, however, will be overridden if a program level is selected on the keyboard, and the column indicator displays any column within the last field used, or displays column 80.

Zero Fill/Blank Fill Switch

The Zero Fill/Blank Fill switch is used to control punching in the leftmost columns of a right adjusted field. When in the ZERO FILL position, the Data Recorder will automatically insert zero punches in the leftmost columns of a right adjusted field during PUNCH mode. When in the BLANK FILL position, the columns will not be punched. They will remain blank.

Column Indicator

This two-digit indicator displays the current position of the buffer storage area into which a character may be entered: Columns 01 through 80. It displays zeroes (00) when the Data Recorder is performing automatic functions (PROG LOAD, REPRODUCE or INTERPRET mode) or awaiting an instruction from the operator to feed a card into the visible wait station.

Keyboard Shift Indicators

The white NUMERIC, UPPER, or ALPHA indicator, when lighted, tells the operator what type of character the Data Recorder is ready to accept from the keyboard. If none are lighted, the keyboard is inactive.

Program Level Indicators

These four white indicators display the program level that is active when the program control switch is in the PROG position. If none light during machine operation, it indicates program control is not in effect. There are four standard program levels and an option available to obtain a total of eight. See Chapter 7, *Optional Features*. When program control is in effect:

- PROG 1 displays the indicator 1
- PROG 2 displays the indicator 2
- PROG 3 displays the indicator 3
- PROG 4 displays the indicator 4
- PROG 5 displays the indicators 1 & 4
- PROG 6 displays the indicators 2 & 4
- PROG 7 displays the indicators 3 & 4
- PROG 8 displays the indicators 1, 3, & 4

Punch Suppress (8010)

This yellow indicator lights when the PUNCH SUPPRESS toggle switch is activated to show that the PUNCH SUPPRESS program storage area is in effect. It is reset by setting the program control switch in the OFF position or by performing a *mode clear*. See Chapter 4, *Mode Clear*.

Error

This red indicator lights whenever a keyboard lockup occurs as a result of an operator error condition.*

Change

This yellow indicator lights simultaneously with the ERROR indicator, during VERIFY mode after the second attempt is made to key a character into memory. This tells the operator an error condition exists and the data must be changed.

The ERROR/RESET key is depressed and the next keystroke performed causes a column of data to be changed in the input memory (either after the second verification attempt or after the VER CORR key has been depressed).*

Reverify

During VERIFY mode, when an error in the card has been detected and a column or field of the buffer memory has been changed, the yellow REVERIFY indicator lights. This tells the operator to REVERIFY the corrected column or field before resuming normal VERIFY operations.*

Stacker

This red indicator lights when a *stacker full* condition occurs. This tells the operator to stop machine operations and remove the cards from the stacker. When a *STACKER* jam occurs, the STACKER and FEED CHECK indicators light. This tells the operator to stop operations and clear a card jam.*

*See Chapter 6, *Operator Recovery Procedures*.

Hopper

The red HOPPER indicator lights when the Data Recorder attempts to feed a card from an empty hopper or when a mis-feed of a card occurs from either hopper.*

Feed Check

The FEED CHECK indicator lights when the machine cover is lifted or when a jam or mis-feed in the punch, print or stacker areas occurs. When the FEED CHECK and the STACKER indicators light at the same time, it indicates a card jam in the stacker area.*

Read Check

This red indicator lights when an off-punched card has been detected during a card read operation.*

Ready (Optional Interface Feature 8001, 8010)

This green indicator lights when the Data Recorder is interfaced to a computer and the ON-LINE function has been activated. It indicates that the Data Recorder is on-line with the computer and is ready to receive commands from the computer through the interface. *See Chapter 7, Interface.*

**See Chapter 6, Operator Recovery Procedures.*

Punch Check (Optional Interface Feature 8001, 8010)

This red indicator is active only when the Data Recorder is interfaced to a computer and the ON-LINE switch has been activated. It lights when an error has been detected at the post-punch read station.*

KEYBOARD SWITCHES AND KEYS

The keyboard is a primary means of data entry. It consists of three frequently used switches, data keys and function keys.

The three keyboard switches are mounted in the upper left portion of the keyboard. These two-position toggle switches are ON in the up position.

The 35 data keys displayed on the keyboard consist of alpha, numeric and special characters. *Figure 2-4 displays the Data Recorder keyboard.*

(a) PROG

The *Program* switch, when in the PROG position permits the operator to load a program and/or to utilize a program. Programming will be ignored by the Data Recorder when this switch is OFF.

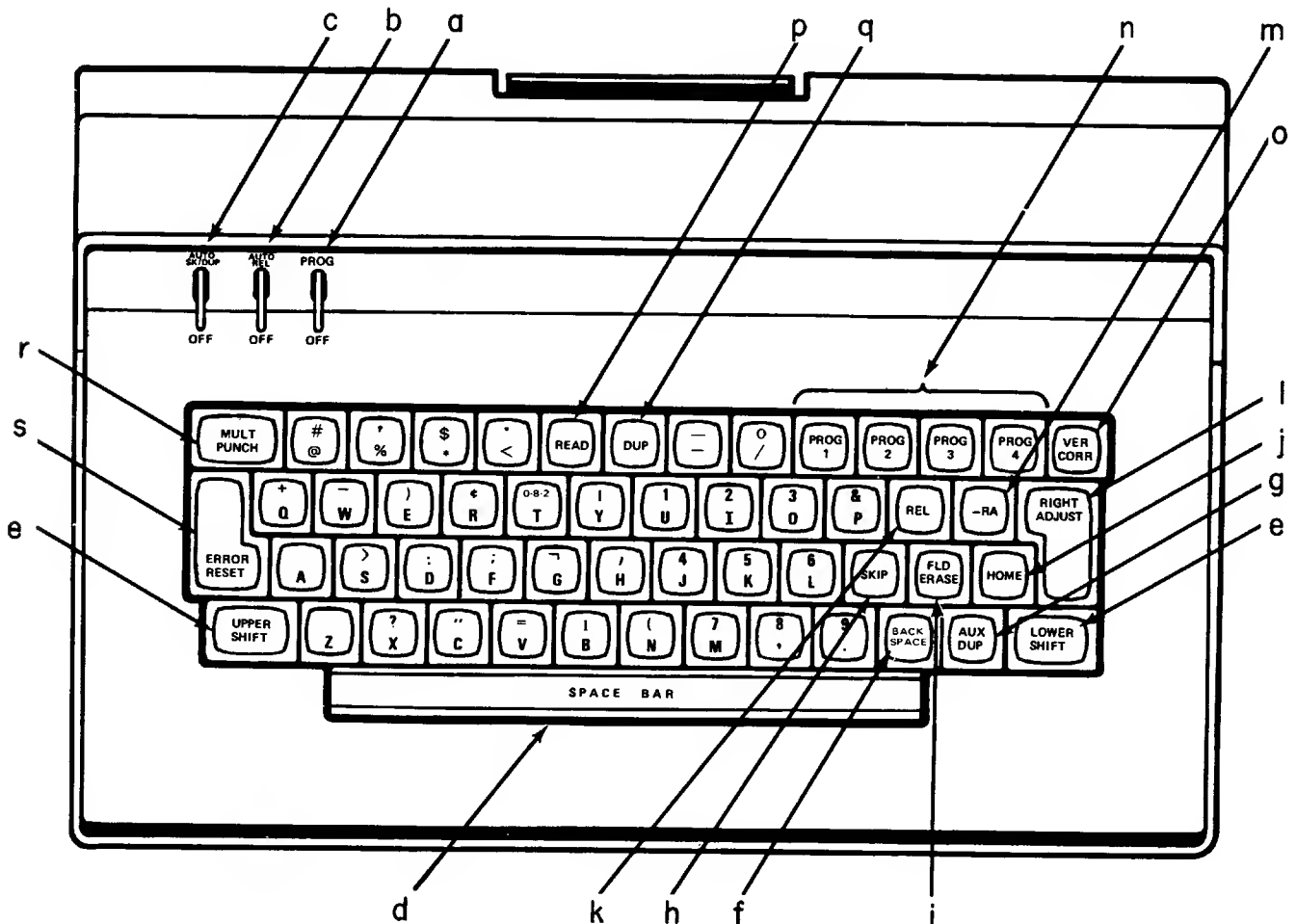


Figure 2.4. Data Recorder Keyboard

(b) *AUTO REL*

The *Automatic Release* switch is used in the PUNCH or VERIFY modes only and is normally left in the AUTO REL position. It causes a completed card to be released into an output stacker and a card to be fed from the input hopper into the visible wait station. When OFF, the REL (release) key must be manually depressed to perform this function.

(c) *AUTO SK/DUP*

The *Automatic Skipping/Duplicating* switch is used with the PROG switch and must be in the AUTO SK/DUP position when automatic (programmed) skipping or duplicating is desired. The switch is turned OFF, to punch the first card of a job after the program has been loaded into a storage level. This allows the operator to key the data to be duplicated into memory. After the first card is punched and released, the switch is set in the AUTO SK/DUP position to initiate the programmed automatic skipping and duplicating of data.

(d) *SPACE BAR*

The *space bar* is used to punch or verify a single space in the record. It also causes the column indicator to advance to the next column in the card.

(e) *UPPER SHIFT and LOWER SHIFT*

The *UPPER SHIFT* key represents the numeric characters and the special characters on the keyboard which are located on the upper portion of each key.

The *LOWER SHIFT* key represents the alphabetic characters which are located on the lower portion of each key.

When the PROG switch is OFF and the keyboard is active, the depression of the UPPER SHIFT or the LOWER SHIFT key puts the keyboard into that specific shift. It remains in that shift until overridden by another shift command. (An optional feature, which can be installed upon request, is available to automatically return the keyboard to LOWER SHIFT when the UPPER SHIFT key is released).

When the program control switch is in the PROG position, and the keyboard is active, depression of either shift key overrides the programmed keyboard shift for as long as it is held down.

Other uses of the LOWER SHIFT and UPPER SHIFT keys are described in *Chapter 4, Supplemental Operations*.

(f) *BACKSPACE*

One depression of the *backspace* key causes the machine to backspace one column and decrease the column indicator by one when in PUNCH mode.

When it is held down, backspacing continues until the key is released or until the beginning of the field is reached.

When an error is encountered while in VERIFY mode and the PROG switch is OFF, the backspace key can be used to reverify a single corrected column if depressed immediately after the column is changed. If this procedure is adhered to for each column changed, reverification of the entire card is not necessary. See *Chapter 3, Reverify*.

(g) *AUX DUP*

When the program control switch is in the PROG position, depression of the *Auxiliary Duplicate* key causes the data stored in a specific field of the *Auxiliary Duplicate* memory to be entered into the buffer memory for punching into the card. See *Chapter 3, Storing Auxiliary Duplicate Data*.

(h) *SKIP*

When the program control switch is in the PROG position, a single depression of this key causes the machine to skip (space over) columns until the first column of the next field is encountered. When OFF, the machine will space column-by-column until the SKIP key is released.

(i) *FLD ERASE*

The *Field Erase* key causes backspacing field-by-field when the program control switch is in the PROG position. When OFF, depression of this key causes backspacing to occur column-by-column until the column indicator 01 is reached.

(j) *HOME*

Depression of the *Home* key returns the column indicator to 01 (home) position. In addition, it causes any stored program change request to be cleared out. It also causes an automatic skip or duplicate instruction, programmed in column 01, to be inhibited.

(k) *REL*

If the automatic release switch on the keyboard is in the AUTO REL position, the REL key, when depressed once, will cause the Data Recorder to automatically skip to the end of a card (if it was in any column other than 00), release the card into an output stacker, and feed another card from an input hopper into the visible wait station.

If the automatic release switch is in the OFF position, depressing the REL key the first time will cause the recorder to automatically skip to the end of a card (if it was in any column other than 00). Depressing the REL key a second time releases the card into an output stacker, and feeds another card from an input hopper into the visible wait station.

When the program control switch and the AUTO SK/DUP switch are in the PROG and AUTO SK/DUP positions, intervening duplicate fields will be recognized for all fields of data in the card when the REL key is depressed at a column other than 00.

Depressing the REL key when the column indicator displays 00 initiates the *release* function and a card is fed from the hopper into the visible wait station.

If the automatic release switch is in the AUTO REL position, the *release* function will be initiated automatically whenever the column indicator has advanced from column 80.

The *release* function performed depends upon the mode of operation.

(l) *RIGHT ADJUST*

The keyboard PROG switch must be ON for the *Right Adjust* key to function.

When in PUNCH mode, the RIGHT ADJUST key is used to move the data in a partially filled field to the rightmost columns of that field. See *Chapter 1, Right Adjust*. If the

column indicator is in the first column of a field, the RIGHT ADJUST key is ignored, hence, at least one character (or blank) must be keyed into a field before it can be right adjusted. Any blank positions which have been keyed will be retained when the RIGHT ADJUST key is used. The left-most positions of the field are filled with blanks or zeroes depending on the position of the ZERO FILL/BLANK FILL switch. See Chapter 4, Zero Fill/Blank Fill.

When in VERIFY mode, the RIGHT ADJUST key is used to exit from a field which has been programmed as a right adjust field. Failure to use the RIGHT ADJUST key at the correct time will cause the ERROR indicator to light. See Chapter 3: *Keypunching Right Adjust or -RA and Verifying Right Adjust or -RA*.

(m) -RA

The *Minus Right Adjust* key right adjusts data in a field in the same manner as the RIGHT ADJUST key. It also causes a credit overpunch (an 11-punch) to punch in the last column of the field to indicate a *negative amount* when in PUNCH mode.

When in VERIFY mode, the -RA key is used to exit from a field which has been programmed as a right adjust field. Failure to use the -RA key at the correct time will cause the ERROR indicator to light. See Chapter 3, *Keypunching Right Adjust or -RA and Verifying Right Adjust or -RA*.

(n) PROG 1, PROG 2, PROG 3, PROG 4

Depression of one of the *program level* keys selects which of the four program storage areas is to be used to store a program. The program control switch must be in the PROG position when program storage is requested; otherwise, the request will be ignored.

(o) VER CORR

The *Verify Correct* key is only active in the VERIFY mode. When it is desirous to change the contents of a field during verification, depression of this key automatically puts the Data Recorder into the PUNCH mode on a field basis, backspacing to the first column of that field. The Data Recorder requires the corrected field to be reverified before continuing normal VERIFY operations for the first column of the next field.

(p) READ

The *Read* key is used in VERIFY mode to feed the *first card* to be verified from the hopper. When the key is depressed, the card is fed from the primary hopper, read, and stopped in the visible wait station for operator verification.

With the automatic release switch in the AUTO REL position and the column indicator at other than column 00, a depression of the READ key causes the card in the visible wait station (a card which is not a read card) to be advanced into the punch station, punched with the data manually entered (and automatically entered if the AUTO SK/DUP and the PROG switches are in the AUTO SK/DUP and PROG positions), then printed at the print station and stacked in stacker #1. A card will then be

fed from the selected input hopper, read, fed through the punch and print stations without punching or printing and stacked in stacker #2 (unless overflow mode of stacker control is active). The information from this card is placed in duplicate storage without editing and is available for subsequent punch operations. A card is then fed from the selected hopper, not read, and stopped in the visible wait station. The column indicator will be at column 01. If the AUTO SK/DUP and the PROG switches are in the AUTO SK/DUP and PROG positions, programmed SK/DUP fields will be recognized.

With the automatic release switch in the OFF position and the column indicator at column 00, a depression of the READ key causes the card in the visible wait station (a card which is a read card) to be fed through the punch and print stations without punching or printing and stacked in stacker #2 (unless overflow mode of stacker control is active). The information from this card is placed in duplicate storage without editing and is available for subsequent punch operations. A card is then fed from the selected hopper, read, and stopped in the visible wait station. The column indicator will be at column 00.

With the automatic release switch in the OFF position and the column indicator at other than column 00, the first depression of the READ key causes the Data Recorder to skip to the end of the card (column count 00). The second depression of the READ key causes the card in the visible wait station (a card which is not a read card) to be advanced into the punch station, punched with the data manually entered (and automatically entered if the AUTO SK/DUP and PROG switches are in the AUTO SK/DUP and PROG position), then printed at the print station and stacked in stacker #1. A card will then be fed from the selected hopper, read, and stopped in the visible wait station. The column indicator will be at column 00.

(q) DUP

When the program control switch is in the PROG position, depression of the *duplicating* key automatically inserts the same information that was in the same column(s) of the previous card into the buffer memory for the new card. The data is transferred a field at a time for a single depression of the key. It transfers data until the key is released. When not under program control, it transfers data column-by-column until the key is released.

(r) MULT PUNCH

The *Mult Punch* key inhibits the column indicator from advancing; hence two, or even more characters may be entered into the buffer memory in the same column position. The resulting combination will be punched (or verified).

MULT PUNCH also overrides the programmed keyboard shift forcing UPPER SHIFT. Chapter 3 discusses other functions using the MULT PUNCH key.

(s) ERROR RESET

This key is used to reset indicators lighted on the operator control panel when the Data Recorder is in PUNCH or VERIFY mode.

Program Codes and Definitions

Figure 3-3 presents a Program Code Chart and the related functions resulting when the codes are punched into an 80 column program card and loaded into memory.

There are three types of programs described in Figure 3-3. *STANDARD DATA FORMATTING*, *PUNCH SUPPRESS* and *PRINT EDIT*.

FUNCTION	PUNCH CODE	FIELD LOCATION & DEFINITION	MODE	TYPE OF PROGRAM	LOAD PROGRAM LEVEL
FIELD DEFINITION	12	Key a 12-punch in every column of the field except the first, (& key, upper shift). Key the first column with the appropriate function punch code. The 12-punches define the length of the field. The column following the end of a designated FIELD DEFINITION is the first column of the next field.	ALL MODES	STANDARD PRINT EDIT	1,2,3 or 4 PRINT EDIT MEMORY
AUTO SKIP (Automatic Skip)	11	Key an 11-punch into the first column of the field, (hyphen (-) key). Complete the field with FIELD DEFINITION 12-punches to define the length of the field. The 11-punch instructs the Data Recorder to skip or ignore the field. In the sample program card in Figure 3.1, columns 14-24 are programmed to automatically skip.	ALL MODES	STANDARD	1,2,3 or 4
AUTO DUP (Automatic Duplicating)	0	Key a zero (0) punch in the first column of the field (0 key, upper shift). Complete the field with FIELD DEFINITION 12 punches. This causes the data that was punched into each column of the same field of the previous card to be duplicated into the card being created. In Figure 3.1, columns 1-13 have been programmed to automatically duplicate the data into each card.	ALL MODES	STANDARD	1,2,3 or 4
		Key a zero (0) punch in the first column of the field (0 key, upper shift). Complete the field with FIELD DEFINITION 12 punches. This causes the Data Recorder to repeat the printing of the character found in that column of the print memory which was initially loaded regardless of the character punched.	ALL MODES	PRINT EDIT	PRINT EDIT MEMORY
LOWER SHIFT (Alpha Characters)	1	Key a 1-punch into the first column of the field (1 key). Hold the MULT PUNCH key down and key a 1-punch and a 12-punch and release the MULT PUNCH key. Repeat this in every column to complete the field. This controls the keyboard to enable the alpha characters embossed on the lower half of the key-tops to be active for each column containing a 1-punch. In Figure 3.1, columns 37-51 are programmed for LOWER SHIFT.	PUNCH & VERIFY	STANDARD	1,2,3 or 4
NUMERIC SHIFT (numeric Characters)	2	Key a 2-punch into the first column of the field (2 key). Hold the MULT PUNCH key down and key a 2-punch and a 12-punch and release the MULT PUNCH key. Repeat this in every column to complete the field. This controls the keyboard to enable the numeric characters (0-9), hyphen (-) and space bar to be active. In Figure 3.1, columns 52-62 are programmed for NUMERIC SHIFT.	PUNCH & VERIFY	STANDARD	1,2,3 or 4

Figure 3.3. Program Code Chart and Related Functions

FUNCTION	PUNCH CODE	FIELD LOCATION & DEFINITION	MODE	TYPE OF PROGRAM	LOAD PROGRAM LEVEL
UPPER SHIFT (special characters)		If the keyboard is not programmed to shift to either a LOWER SHIFT or a NUMERIC SHIFT condition, the DataRecorder assumes a command has been given for UPPER SHIFT. i.e., The characters embossed on the upper half of the key-tops are active during the PUNCH and VERIFY modes.			
SELF-CHECKING NUMBER	3	Key a 3-punch in the first column of the field (3 key). Complete the field with FIELD DEFINITION 12-punches. This identifies the field as one that contains a self-checking number as shown in Figure 3.1, columns 63-80.	PUNCH	STANDARD	1,2,3, or 4
VERIFY RIGHT ADJUST	3	Key a 3-punch in the first column of a field to be right adjusted (3 key). Complete the field with FIELD DEFINITION 12-punches. In Figure 3.1, Columns 63-80 are programmed to RIGHT ADJUST.	VERIFY	STANDARD	1,2,3 or 4
BLANK COLUMN VERIFICATION		Key FIELD DEFINITION 12-punches into every column except the first column. The first column remains blank (no punches). It is used by the Data Recorder to identify the field as one for blank column verification. See Chapter 4, BLANK COLUMN VERIFICATION. In Figure 3.1, columns 25-36 have been programmed with blank columns.	VERIFY	STANDARD	1,2 3 or 4
PUNCH SUPPRESS	1	Key a 1-punch into the desired column(s) or field(s) (1 key). This instructs the Data Recorder to suppress (prevent) the punching of data into the card for those columns or fields programmed with the PUNCH SUPPRESS code.	PUNCH & REPRODUCE	PUNCH SUPPRESS	4
PRINT SUPPRESS	11	Key an 11-punch into the first column of the field, (hyphen (-) key). Complete the field with FIELD DEFINITION 12-punches. This instructs the Data Recorder to inhibit (prevent) printing from occurring on the top of the card for those columns programmed with the PRINT SUPPRESS code.	ALL MODES	PRINT EDIT	PRINT EDIT MEMORY
11-BIT ELIMINATE	11 & 0	Key a zero (0) punch in every column except the first and last columns of the field. The first column remains blank. Key an 11-punch and a zero (0) into the last column while holding the MULT PUNCH key down. This instructs the Data Recorder to print the character that would result if an 11-punch (negative sign bit) were not present in the punched character. Hence, a punched character (L) would print the numeric 3 and the punched character (R) would print the numeric 9.	ALL MODES	PRINT EDIT	PRINT EDIT MEMORY
SUPPRESS IN-SIGNIFICANT ZEROES	9	Key a 9-punch in the first column of the field (9 key). Hold the MULT PUNCH key down and complete the field with 12-punches and 9-punches. This instructs the Data Recorder to prevent printing of the leading (insignificant) zeroes in a field of numerics.	ALL MODES	PRINT EDIT	PRINT EDIT MEMORY

Preparing the Program Card

A program control card is prepared by punching control codes into a blank card. More than one control bit (punch) may be entered into a column position by use of the MULT PUNCH key. Data fields programmed to automatically duplicate must at some time be entered by the operator. It is best to include the desired keyboard shift code with the duplicate code to enable the auto dup information to be keyed-in when the first card is keypunched. FIELD DEFINITION codes should be included for all fields.

The example used in this section is typical of the work performed by the Data Recorder operator: keypunching cards from employee time cards for payroll information. *Figure 3-4 shows an example of the Weekly Time Card that will be the source document for the sample job outlined in this chapter. It also shows the areas of the time card to be punched and the names and card columns assigned to those areas.*

The pertinent information from the time card must be punched into the columns that the computer has been instructed to read. Each field must be in the proper location on the card.

In order for the operator to prepare a correct program card, the locations assigned to the various fields must be known. A list of the field names and the card columns they will be punched into must be provided by the computer programmer or the keypunch supervisor. *The instructions to key the program card are listed in Figure 3-5.*

Punching A Program Card

Punching of the STANDARD program card for the sample job is an example of punching a single card; one for which a pre-punched program card would not be utilized.

1. Set the mode switch to PUNCH.
2. Set the automatic release switch in the AUTO REL position; the AUTO SK/DUP and PROG switches OFF.
3. Set the print mode switch to PRINT or OFF, as desired (8010).
4. Place a blank card in the primary hopper.
5. Press the REL key. (The card feeds into the visible wait station; the column indicator displays 01 and the keyboard becomes active).
6. Key the program codes into the buffer. (*See Figure 3-5, Program Codes and Sample Punched Program Card.*)

The card is released from the visible wait station, punched, printed (8010) and released into stacker 1.

WEEKLY TIME CARD

(This card must be forwarded to Payroll Department before payment can be made)

WEEK ENDING 1/14/73

EMPLOYEE NAME (COLUMNS 7-32) PARKER, J.S.

EMPLOYEE NUMBER (COLUMNS 33-40) 15807

WEEK ENDING DATE (COLUMNS 1-6)

DEPARTMENT NUMBER (COLUMNS 41-44) 501

Position

Dept. No. 501

	A. M.		P. M.		OVERTIME		EXTRA		Total Hours		
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	Regular	Overtime	Extra
MONDAY	8.0	12.0	13.0	17.0					8.0		
TUESDAY	8.0	12.0	13.0	17.0					8.0		
WEDNESDAY	8.0	12.0	13.0	17.0					8.0		
THURSDAY	8.0	12.0	13.0	17.0					8.0		
FRIDAY	8.0	12.0	13.0	17.0					8.0		
SATURDAY											
SUNDAY											
TOTAL FOR THE WEEK									40.0		

I, the undersigned, certify that the records indicated above were my true and accurate working hours for the payroll period.

Signature

MONDAY HOURS (COLUMNS 46-48)

TUESDAY HOURS (COLUMNS 50-52)

WEDNESDAY HOURS (COLUMNS 54-56)

THURSDAY HOURS (COLUMNS 58-60)

FRIDAY HOURS (COLUMNS 62-64)

SATURDAY HOURS (COLUMNS 66-68)

SUNDAY HOURS (COLUMNS 70-72)

Figure 3.4. Assignment of Field Names

COLUMN NUMBER(S) & FIELD NAMES	INSTRUCTIONS TO KEY
1-6 (Week Ending Date)	Code for AUTO DUP. Key a zero (0) punch into column 1 and FIELD DEFINITION 12-punches (& key) into columns 2-6. The zero-punch instructs the Data Recorder to auto dup the date (as all the time cards in the sample batch will be for the same period) and the 12-punches define the length of the field for duplication.
7-32 (Employee Name)	Code for ALPHA SHIFT. Key a 1-punch into column 7. To complete the field, hold the MULT PUNCH key down and key in a 1-punch and a 12-punch and release the MULT PUNCH key. Repeat this in columns 8-32. This instructs the Data Recorder that this is an ALPHA CONTINUE field. Note: The alphabetic field can also be defined by holding the LOWER SHIFT key down while keying in the alphabetic character "A" in columns 8-32.
33-40 (Employee Number)	Code for NUMERIC SHIFT. Key a 2-punch (2 key) into column 33. This instructs the Data Recorder that NUMERIC SHIFT is to be used so that numbers can be entered into the field. To complete the field, hold the MULT PUNCH key down and key in a 2-punch and a 12-punch and release the MULT PUNCH key. Repeat this in columns 34-40 to instruct the Data Recorder that this is a NUMERIC FIELD CONTINUE field. Note: The numeric field can also be defined by holding the LOWER SHIFT key down while keying in the alphabetic character "B" in columns 34-40.
41-44 (Department Number)	Code for a NUMERIC SHIFT field. Key a 2-punch into column 41; hold the MULT PUNCH key down and key a 2-punch and 12-punch into columns 42-44 to complete the field.
45 (Blank)	Code for AUTO SKIP. This column is not assigned to a field. Key in an 11-punch by use of the hyphen (-) key.
46-48 (Monday Hours)	Code for a NUMERIC SHIFT field.
49 (Blank)	Code for AUTO SKIP.
50-52 (Tuesday Hours)	Code for a NUMERIC SHIFT field.
53 (Blank)	Code for AUTO SKIP.
54-56 (Wednesday Hours)	Code for a NUMERIC SHIFT field.
57 (Blank)	Code for AUTO SKIP.
58-60 (Thursday Hours)	Code for a NUMERIC SHIFT field.
61 (Blank)	Code for AUTO SKIP.
62-64 (Friday Hours)	Code for a NUMERIC SHIFT field.
65 (Blank)	Code for AUTO SKIP.
66-68 (Saturday Hours)	Code for a NUMERIC SHIFT field.
69 (Blank)	Code for AUTO SKIP.
70-72 (Sunday Hours)	Code for a NUMERIC SHIFT field.
73-80 (Blank)	Code for AUTO SKIP. Key an 11-punch in column 73 and FIELD DEFINITION 12-punches in columns 74-80.

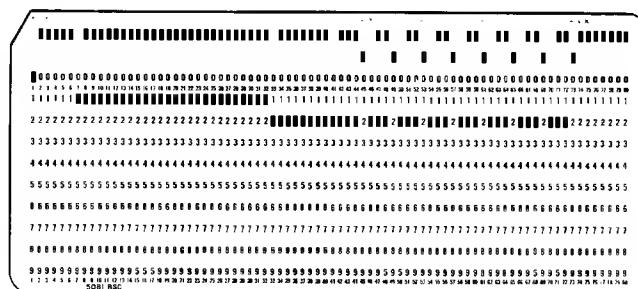


Figure 3.5. Programs Codes and Sample Punched Card

LOADING THE PROGRAM

When the program card has been prepared, load it into a program storage area.

1. Select **PROG LOAD** with the mode switch.
2. Place the program control card in the primary hopper.
3. Set the program control switch in the **PROG** position.
4. Select the desired program storage area (level): **PROG 1, PROG 2, PROG 3, PROG 4**.
5. Press the **START** switch.

The program card is read, stored in the selected program level and released into stacker 2.

PREPARING TO KEYPUNCH

After the program has been loaded, prepare to keypunch the job.

1. Set the mode switch to PUNCH.
2. Place a supply of blank cards in the primary hopper.
3. Set the automatic release and the program switches in the AUTO REL and PROG positions; the AUTO SK/DUP switch OFF.
4. Set the print mode switch to PRINT. (8010)
5. Press the REL key. (Feeds a card into the visible wait station and the column indicator displays 01).

Keying the First Card

The first card of the job is keyed with the program control switch in the PROG position; the AUTO SK/DUP switch OFF. The fields programmed to automatically duplicate must be keyed for the first card. Use the SKIP key to skip over each field which will be programmed to automatically skip. One depression of the key causes the entire field to be skipped. *The key entry for the source document is shown in Figure 3-4.*

1. Key the date, 041073, into columns 1-6.
2. Key the employee's name, beginning with column 7. (The keyboard automatically shifted to LOWER SHIFT and the ALPHA indicator turned on).
3. Press the SKIP key once to complete the field with blanks since the employee's name does not fill the name field. (The column indicator advances to column 33 and the NUMERIC indicator lights).
4. Key the employee number and press the SKIP key to complete the field. (The column indicator advances to column 41).
5. Key the department number and press the SKIP key to complete the field. (The column indicator advances to column 45).
6. Press the SKIP key. (This column 45 is programmed to automatically skip, but the *dup* and *skip* programming will be ignored until the AUTO SK/DUP switch is set in the AUTO SK/DUP position).
7. Key the rest of the card; use the SKIP key to bypass the blank fields.

The card releases from the visible wait station and is punched and printed (8010) and released into stacker 1. (A sample of the punched card is shown in Figure 3-6.)

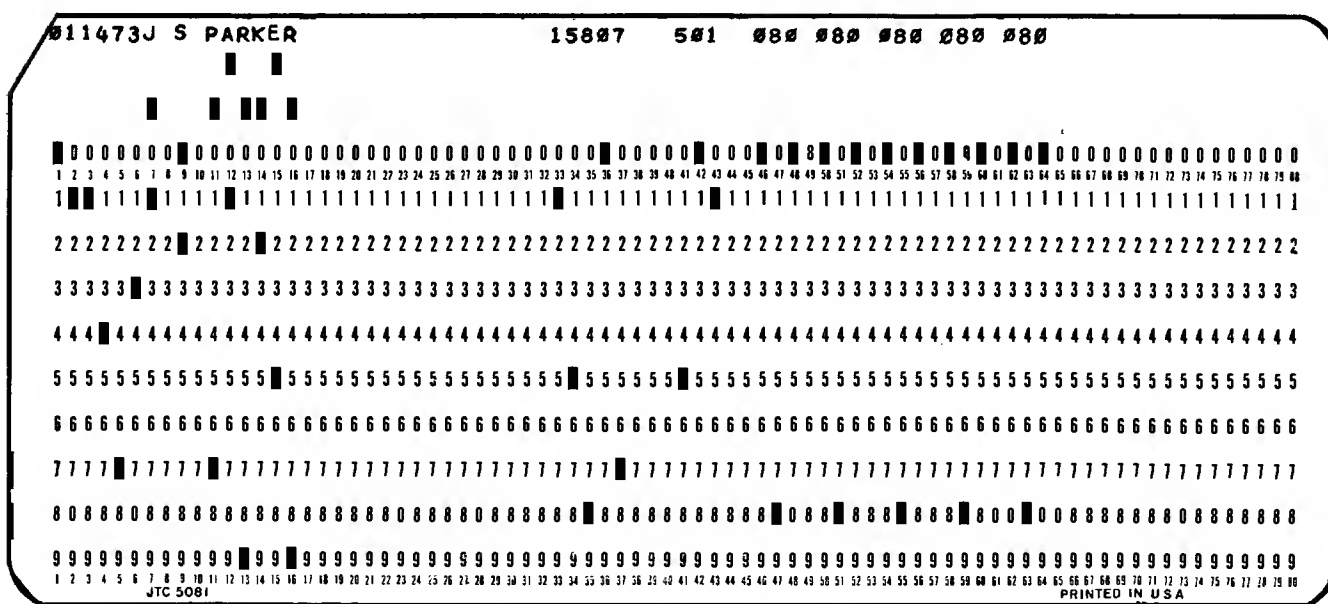


Figure 3.6. Example Punched and Printed Card

Keypunching the Job

The routine entry of data begins after the first card of the job has been completed. Now that the fields programmed to automatically duplicate have been keyed with the data to be duplicated, set the AUTO SK/DUP switch in the AUTO SK/DUP position.

Since the first six columns of the card are programmed to duplicate the date, the column indicator displays 07 for the sample job. This is the first column to be key entered. As the data is keyed, it is stored into the buffer memory. When entry is completed or 80 columns of data have been entered, the Data Recorder punches and prints (8010) the data into the card. The card is automatically released into stacker I and a blank card is fed through the read station and stopped in the visible wait station for keypunching the next time card.

Keypunching Right Adjust or -RA

Any partial field of data can be right adjusted, or minus right adjusted and punched as a negative amount, during PUNCH mode by use of the RIGHT ADJUST or —RA keys.

The RIGHT ADJUST key is used to cause the DATA Recorder to shift the data in a partially filled field into the rightmost columns of that field.

The —RA key is used to perform the same function as the RIGHT ADJUST key. In addition, it causes the Data Recorder to automatically insert an 11-punch over the last digit entry of a partially filled field to indicate a negative amount.

When a partial field of data is to be right adjusted or minus right adjusted, the following steps are performed:

1. Key the data into the field beginning with the first column of the field.
2. Press the appropriate key, RIGHT ADJUST or —RA.

If a field to be right adjusted contains a keyed entry in every column of the field, this represents a full field; therefore, it is not necessary to depress the RIGHT ADJUST key.

When a full field of data must indicate a negative amount, the —RA key cannot be used. The following steps are performed:

1. Key the data into the field with the exception of the last digit.
2. Hold the MULT PUNCH key down and key the last digit and an 11-punch (—key). Release the MULT PUNCH key.

Note: Any columns within a RIGHT ADJUST or -RA field which have been keyed with blanks will be retained. Also the leftmost columns of the field which have not been keyed will remain blank unless the ZERO FILL/BLANK FILL switch is in the ZERO FILL position. When set in the ZERO FILL position, the Data Recorder will automatically fill the leftmost blank columns of the field with zero punches. The switch is set in the ZERO FILL position after performing Step 4. in PREPARING TO KEY-PUNCH. If zero punches are not to be inserted, (leftmost columns to remain blank), the switch remains in the BLANK FILL position.

VERIFICATION

Verification is a key mode operation similar to keypunching. It is performed to check the accuracy of cards that have been keypunched by re-keying the data punched in each card. The operator uses the same *source document* to verify the cards that was used to keypunch the cards. When a card has been correctly verified, the Data Recorder punches two holes in column 81 of the card to signify that the card has been verified as correct. When a new card is created during verification to correct error conditions in the original card it contains only one verify hole in column 81 of the card. See Figure 3-7.

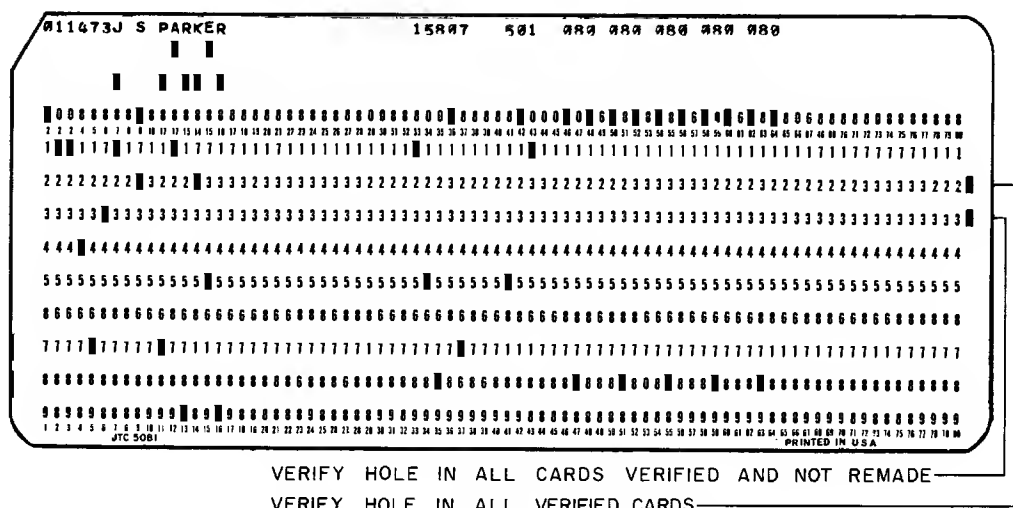


Figure 3.7. Location of Verify Punches

The Verify Program Control Card

The same program card used to keypunch the deck of cards may also be used to verify the cards with two exceptions:

1. Right Adjusted fields.
2. A Self-Check Number field not right adjusted.

A new program control card must be prepared when either of these conditions exist since the same punch code (3-punch) used in PUNCH mode to identify a Self-Checking Number field is also used in VERIFY mode to identify those fields which have been right adjusted. (As discussed in Key punching Right Adjust, -RA, any field to be right adjusted during PUNCH mode is manually performed by use of the keyboard keys, RIGHT ADJUST or -RA).

Therefore, the following is performed to permit verification of fields which have been right adjusted during PUNCH mode and to permit verification of a Self-Checking Number field which has not been right adjusted. Prepare the program control card using the same punch codes for each field as used in PUNCH mode with the exception of the following:

1. Code the right adjusted field(s) with a 3-punch in the first column of the field and complete the field with FIELD DEFINITION 12-punches.
2. Code the Self-Checking Number field which has not been right adjusted with FIELD DEFINITION 12-punches in every column but the first. The first column remains blank.

Load the program into memory and begin verification of the cards. *Refer to the chapter paragraph, Verifying Right Adjust or -RA and Chapter 7, Self-Checking Numbers.*

Verifying The First Card

This procedure must be performed when verifying the first card of a keypunch job.

1. Load the program control card. (Only if different from the program used in PUNCH mode).
2. Set the mode switch to VERIFY.
3. Place the cards to be verified in the primary hopper.
4. Place a supply of blank cards in the secondary hopper.
5. Set the automatic release and program control switches in the AUTO REL and PROG positions; the AUTO SK/DUP switch OFF. (First card only.)
6. Press the READ key. (The first card is read and fed into the visible wait station).
7. Key the data fields, including the programmed *dup* fields.

After the first card is verified, it is punched in two places in "Column 81" and released into stacker 1.

Note 1: On the 8010, unprinted cards will not be printed in VERIFY mode, unless the print control switch is set to VER PRINT; however, remade cards will be printed if the switch is set for PRINT or PRINT EDIT.

Note 2: To verify zero punches in the leftmost columns of a right adjusted field, the ZERO FILL/BLANK FILL switch must be in the ZERO FILL position. If the leftmost columns of a right adjusted field are blank (no punches), the switch remains in the BLANK FILL position.

Verifying Right Adjust or -RA

Expanding Step 7. above, right adjusted fields are verified in the following manner.

1. Key the data into the fields beginning with the first column of the field.
2. Press the appropriate key, RIGHT ADJUST or -RA to exit from the field.

Verifying The Job

The second card is automatically released from the primary hopper, read and fed into the visible wait station for verification.

1. Set the AUTO SK/DUP switch in the AUTO SK/DUP position.
2. Key the data fields under program control.

Each succeeding card will automatically be released, read, and fed into the visible wait station for verification. The cards are punched with two verify holes and released into stacker 1.

ERROR CORRECTION

When the character(s) punched in the card does not agree with the character(s) keyed, the ERROR indicator lights and the keyboard locks. This means an *error condition* has been detected by the Data Recorder and must be manually corrected by the operator.

Correcting a Column

When a column error is detected the ERROR indicator lights.

1. Press the ERROR RESET key. (ERROR indicator turns off).
2. Press the correct data key. (Both the ERROR indicator and the CHANGE indicator light). Note: If the error condition was the result of a mis-key by the operator, the ERROR and CHANGE indicators do not light and verifying can continue.
3. Press the ERROR RESET key. (The ERROR indicator turns off and the CHANGE indicator remains lighted to show that the next keystroke will change memory).
4. Press the correct data key again. (The CHANGE indicator turns off).

The correct character is stored in the buffer memory and verifying continues to the end of the field; then the REVERIFY indicator lights. When not under program control, the REVERIFY indicator lights after a full card image has been verified. The time the REVERIFY function is performed depends on the mode of operation as described in the paragraph, *Reverifying a Column*.

Note 1: When a correction is required to only the last character in a RIGHT ADJUST field which has a negative value, the CHANGE indicator lights after two ERROR indications:

1. Hold the MULT PUNCH key down; key in the correct number and key in an 11-punch (- key) in the column.
2. Reverify the keyed data.
3. Press the -RA key to exit the field.

Reverifying A Column

When information in the buffer memory has been changed, it must be *reverified*.

1. **PROG switch ON**—Under program control, the operator corrects the column error and verifies the balance of the columns in the field. At that time, the REVERIFY indicator lights. The Data Recorder backspaces to the first column of the field and displays it on the column indicator. The operator *re-keys the complete field* to REVERIFY the changed column(s). The REVERIFY light turns off and verification of the card can continue.
2. **PROG switch OFF**—When verifying is not performed under program control and a change is made, the REVERIFY indicator does not light until the card has been completed. This means the entire card must be reverified.

In order to avoid having to reverify the entire card, merely use the backspace key after a change has been made to a column and re-key the changed data. This permits reverifying only those columns that have been changed.

Correcting A Field

At times, it is easier to change an entire field, when errors occur, rather than change the columns individually. When the ERROR indicator lights, the field may be changed by use of the VER CORR (Verify Correct) key.

1. Press the ERROR RESET key. (ERROR indicator turns off).
2. Press the VER CORR key. (The CHANGE indicator lights and the column indicator displays the first column of the field).
3. Re-key the field (The CHANGE indicator turns off, the REVERIFY indicator lights and the column indicator displays the first column of the field).
4. Re-key the field (The REVERIFY indicator turns off).

After the entire card has been verified, the Data Recorder performs the *Automatic Card Remake Cycle* as described in this chapter.

Correcting Right Adjust Or -RA Field On A Field Basis

When an error has been detected by the Data Recorder in a *RIGHT ADJUST* or *-RA* field, the ERROR indicator lights.

1. Press the ERROR RESET key. (The ERROR indicator goes off).
2. Re-key the data. (The ERROR and CHANGE indicators light). Note: If the error condition is a result of a mis-key in verify, the ERROR indicator will not light and verifying continues.
3. Press the ERROR RESET key. (The ERROR and CHANGE indicators light).
4. Press the VER CORR key. (The ERROR indicator goes off, the CHANGE indicator remains lighted and the column indicator displays the first column of the field).
5. Re-key the field.
6. Press RIGHT ADJUST or -RA key, whichever applies. (The REVERIFY indicator lights and the CHANGE indicator goes off).

7. Re-key the data (REVERIFY).
8. Press RIGHT ADJUST or -RA key, whichever applies and continue to verify the remaining punches in the card.

Note 1: When an alphabetic character is being verified as the character in the rightmost column of a RIGHT ADJUST field, hold the LOWER SHIFT key down (or program a LOWER SHIFT 1-punch) while keying in the alphabetic character. Press the RIGHT ADJUST key to exit the field.

Automatic Card Remake Cycle

When an error has been corrected and reverified and the remaining punches of the card verified, the Data Recorder *automatically makes a new card*.

1. Places the error card in stacker 2 without punching a verify hole.
2. Feeds a blank card from the secondary hopper.
3. Punches and prints (8010) the blank card with the correct data and other verified data.
4. Punches one verify hole in Column 81 of the remade card indicating *remade card*.
5. Releases the remade card into stacker 1, reads the next card from the primary hopper, and feeds it into the visible wait station for verification.

PUNCH SUPPRESS PROGRAMMING (8010)

It is often desirable to print data on a card but not punch the data into the card. This is accomplished by use of the PUNCH SUPPRESS program feature. A program card must be punched and loaded into Program Level 4. See *Figure 3-3*.

Punching A Program Card

1. Set the mode switch to PUNCH.
2. Set the automatic release switch in the AUTO REL position; the AUTO SK/DUP and PROG switches OFF.
3. Set the print mode switch to PRINT.
4. Place a blank card in the primary hopper.
5. Press the REL key; the card feeds into the visible wait station; the column indicator displays 01 and the keyboard becomes active.
6. Key a 1-punch into the columns where PUNCH SUPPRESS is desired.
7. Press the REL key; the card releases into stacker 1.

Loading The Program

When the program card is completed, the data must be stored in PROG Level 4 for the PUNCH SUPPRESS feature to be active.

1. Select PROG LOAD with the mode switch.
2. Place the PUNCH SUPPRESS program control card in the primary hopper.
3. Set the program control switch in the PROG position.
4. Press the PROG 4 key.
5. Press the START switch.

The card is read, stored into memory and released into stacker 2. When the PUNCH SUPPRESS switch is activated and keypunching begins under program control, the data with these columns coded for PUNCH SUPPRESS will be printed on the cards but not punched in the cards.

Preparing To Keypunch

1. Set the mode switch to PUNCH.
2. Place a supply of blank cards in the primary hopper.
3. Set the automatic release and program control switches in the AUTO REL and PROG positions; the AUTO SK/DUP switch OFF.
4. Set the print mode to PRINT.
5. Move the PUNCH SUPPRESS toggle switch upwards. (Activates the PUNCH SUPPRESS program).
6. Press the REL key.

Key the first card and keypunch the job with the use of the appropriate switch controls as described for the sample job, *Keypunching the First Card and Keypunching the Job*.

Note: The PUNCH SUPPRESS feature is turned OFF by setting the PROG switch in the OFF position or by performing a mode clear.

PRINT EDIT PROGRAMMING

The PRINT EDIT program feature has the specific function of controlling the data to be printed on a column-by-column basis on the cards to be processed.

There are four functions which can be performed under PRINT EDIT control:

1. PRINT EDIT, AUTO DUP

The Data Recorder can be programmed to print duplicate information on the 80 column cards regardless of the data punched in the associated card columns below.

2. PRINT EDIT, PRINT SUPPRESS

The Data Recorder can be programmed to suppress (prevent) the printing of certain data on the 80 column cards on a field basis.

3. PRINT EDIT, 11-BIT ELIMINATE

The Data Recorder can be programmed to suppress the printing of a negative overpunch in a minus right adjusted field. For example, if the number 123 were minus right adjusted, the card would normally be printed 12L as the character "L" results from combining the 11-punch with the 3-punch code. However, if the Data Recorder is programmed with the 11-Bit Eliminate punch code, the punched character "L" will print as the digit 3.

4. PRINT EDIT, SUPPRESS INSIGNIFICANT ZEROS

The Data Recorder can be programmed to suppress the printing of leading (insignificant) zeroes in a field of numerics. When the field of data is released for printing on the card, the leading (insignificant) zeroes will not be printed.

One or all four of the above functions can be effective by punching and loading a program card(s) into memory using the PRINT EDIT punch codes as defined in Figure 3.3. However, only one program may be stored in PRINT EDIT memory at one time. Note: If a PRINT EDIT, AUTO DUP program is to be effective, a Master card must also be prepared and loaded into memory which contains

the information to be duplicated for printing on the 80 column cards. The preparation of the Master card is described further in this section.

Punching The Program Card

1. Set the mode switch to PUNCH
2. Set the automatic release switch in the AUTO REL position; the AUTO SK/DUP and PROG switches OFF.
3. Set the print mode switch to PRINT or OFF, as desired.
4. Place a blank card in the primary hopper.
5. Press the REL key; the card feeds into the visible wait station; the column indicator displays 01 and the keyboard becomes active.
6. Key the desired punch code(s) (Figure 3.3) into the column(s).
7. Press the REL key.

The card is punched and printed, then released into stacker 1.

Loading the Program

PRINT EDIT programs are stored in a special program storage area which is separate from the four standard program levels. Although one of the four program level indicators will be lighted after loading the PRINT EDIT program, the use of the MULT PUNCH key prevents the card from reading into the displayed program level or any of the other three standard program storage areas.

1. Select PROG LOAD with the mode switch.
2. Place the PRINT EDIT program control card into the primary hopper.
3. Set the program control switch in the PROG position; the AUTO REL and AUTO SK/DUP switches OFF.
4. Hold the MULT PUNCH key down and,
5. Press the START switch.

The card is read, the data is stored in the special PRINT EDIT memory and the card is released into stacker 2.

Preparing and Loading The Master Card

If a PRINT EDIT, AUTO DUP program has been loaded into memory, the duplicate information must be punched into a Master card and loaded into memory to enable the Data Recorder to duplicate the printing of the information on the 80 column cards. To do this:

1. Set the mode switch to PUNCH.
2. Place a blank card in the primary hopper.
3. Set the keyboard switches in the AUTO REL position; the AUTO SK/DUP and PROG switches OFF.
4. Set the print switch to PRINT.
5. Press the REL key.
6. Key the information into the field(s) programmed to duplicate.
7. Press the REL key. (The Data is read and stored into memory and the card is punched and printed and released into stacker 2).
8. Set the print switch to PRINT EDIT.

Preparing to Keypunch

1. Set the mode switch to PUNCH.
2. Place a supply of blank cards in the primary hopper.

3. Set the automatic release and program control switches in the AUTO REL and PROG positions; the AUTO SK/DUP switch OFF.
4. Set the print switch to PRINT EDIT. (Eliminate this step if Step 8 has been performed in Preparing and Loading the Master Card).
5. Press the REL key. (Feeds a card into the visible wait station).

Key the first card and keypunch the job with the use of the appropriate switch controls as described for the sample keypunch job; keypunching the first card and keypunching the job.

AUXILIARY DUPLICATE DATA

The *Auxiliary Duplicate memory* is used when the operator wishes to insert frequently used data in a specific field(s). Rather than keying the data, a single depression of the AUX DUP key will punch the data into the entire field automatically. Program Level 4 is used to store Auxiliary Duplicate data. *Note: If Program 4 is stored with a PUNCH SUPPRESS program, it cannot be used, at the*

same time, to store a standard formatting program or Auxiliary duplicate data. Program Level 4 will store only one program at one time.

Storing Auxiliary Duplicate Data

1. Prepare a card with the Aux Dup data in the required field(s).
2. Set the mode switch to PROG LOAD.
3. Set the program control switch in the PROG position; AUTO REL and AUTO SK/DUP OFF.
4. Place the Aux Dup data card in the primary hopper.
5. Press PROG 4 key.
6. Hold down the LOWER SHIFT key and,
7. Press the START switch.

The Data Recorder reads the cards, stores the data into program level 4 for keypunch control and releases the cards into stacker 2. *Note: During the keypunch function, the operator must depress the AUX DUP key to request the data stored in the AUX DUP memory to be punched and printed (8010) on the card.*

8. Load any other program memories as required.

4/SUPPLEMENTAL OPERATIONS

MOTOR TIME-OUT

When the power switch is ON and a Data Recorder operation is initiated, the motor will automatically turn on: The motor will continue to run as long as the Data Recorder is used. If the Data Recorder remains idle for approximately 20 seconds, the motor will time-out and stop. *Motor time-out* merely minimizes wearing of the mechanical parts of recorder. It does not affect operation of the Data Recorder as there is no loss of the data that has been entered. The motor will automatically restart as soon as the use of the Data Recorder resumes.

MODE CLEAR

A *mode clear* is performed to clear the Data Recorder of previous instructions received from the operator. The Data Recorder is cleared by rotating the mode switch from one setting to another.

Mode Clear is also used to recover from certain error conditions. It causes the Data Recorder to complete a cycle which may have been terminated early because of an error. Mode Clear should be used as a general recovery operation to reset the Data Recorder cycle.

STACKER OVERFLOW

During the PUNCH or REPRODUCE mode, it is possible to direct stacker 1 and stacker 2 to act in an *overflow* manner. All cards punched or reproduced will first be released into stacker 1; when stacker 1 is full, cards will automatically be released into stacker 2. The overflow condition can also be used during Interspersed operations when both master and detail cards are stacked (merged) in the same stacker or when interfiling reproduced cards or blank cards within a punched card file. Hold the MULT PUNCH key down and press the START switch to cause the overflow condition to occur.

The Data Recorder is reset to normal stacker operation by performing a mode clear.

STACK MASTER AND DETAIL CARDS

During the Interspersed operation, *master* cards are normally released into stacker 1 and *detail* cards are released into stacker 2. When both master and detail cards are to be released (merged) into stacker 1, hold the MULT PUNCH key down and then press the START switch. Now, when stacker 1 is full, card overflow will automatically go to stacker 2.

Perform a mode clear to reset the Data Recorder to normal stacker selection.

LOADING THE HOPPERS

1. Jog the cards on all sides to even the deck.
2. Fan the cards two or three times to rid the deck of foreign matter and card dust.
3. Move the paddle to the back of the hopper and load the deck, face forward, with the column 1 edge to the left.

4. Ensure that the bottom edge of the deck of cards is as far forward in the hopper as possible. i.e. The cards are in a straight upright position and not slanting forward.

FEEDING A SINGLE CARD

Cards are normally fed from the primary hopper. When a single card is to be fed from the secondary hopper during PUNCH or VERIFY mode, hold the UPPER SHIFT key down during the feed cycle. If the AUTO REL switch is OFF, hold the UPPER SHIFT key down and press the REL key.

HOPPER REVERSE

A *hopper reverse* condition can be initiated to automatically feed cards from the secondary hopper rather than the primary hopper during PUNCH, VERIFY, REPRODUCE, or INTERPRET mode. Hold the UPPER SHIFT key down and press the START switch. Feeding will now automatically be done from the secondary hopper. Press the UPPER SHIFT key down during the hopper reverse feed cycle to select a card from the primary hopper.

The hopper reverse condition is cleared by performing a mode clear.

LOADING MORE THAN ONE PROGRAM

More than one program can be used to perform a keypunch operation. There are four standard program storage areas. Follow the steps below to load each program card into a selected memory.

1. Select PROG LOAD with the mode switch.
2. Place the program control cards in the primary hopper.
3. Set the program control switch in the PROG position.
4. Select the desired program storage area for the first card: PROG 1, PROG 2, PROG 3 or PROG 4.
5. Press the START switch. (The program contained in the card will be stored into the program storage area selected and the program card will be released to an output stacker).
6. After the first program card has been released to the stacker, repeat steps 4 and 5 above to load each subsequent program card.

Note: Program control cards may be loaded from the secondary hopper; press the UPPER SHIFT key and the START switch in place of Step 5. above.

LOADING PROGRAM LEVELS 5, 6, 7, 8 (Optional FEATURE)

When selecting a program level higher than program level 4, the LOWER SHIFT key and the PROG 1, 2, 3 and 4 keys are used in Step 4 above.

Select PROG level 5; press LOWER SHIFT and PROG 1 key
Select PROG level 6; press LOWER SHIFT and PROG 2 key
Select PROG level 7; press LOWER SHIFT and PROG 3 key
Select PROG level 8; press LOWER SHIFT and PROG 4 key

CHANGING PROGRAM LEVELS

Program levels may be changed to perform a keypunch operation by depressing the appropriate PROG key. However, there are conditions to observe:

1. Changing program levels when the column indicator displays zeroes (00) will cause a card in the wait station to be processed and released into a stacker. At the same time, a card will feed from the hopper into the visible wait station.
2. Program levels must be changed in the first column of a field. When a program level change is directed within a field (not the first column of the field) the change will not occur until the first column of the next field.
3. Once a program level has been selected (program revert switch in the NONE position), the Data Recorder will stay in that level until another PROG key is pressed or the PROG switch is turned OFF. When in the PROG position, the Data Recorder will automatically select PROG level 1.

CHANGING PROGRAMMED DUPLICATE DATA

PUNCH MODE—The contents of fields programmed to duplicate may have to be changed occasionally within a job. There are two ways to change duplicate field data.

1. Turn the AUTO SK/DUP switch OFF and key the new data into the field to be changed. Then set the keyboard switch in the AUTO SK/DUP position.
2. Press the READ key to read the new data from a pre-punched master card.

VERIFY MODE—When data in an auto dup field has been changed during the PUNCH mode, (i.e., new batch of time cards with different week ending date), the change will be detected during the VERIFY mode. The ERROR indicator will light and the column indicator will advance to the column that was changed.

1. Turn the AUTO SK/DUP switch OFF.
2. Press the ERROR RESET key.
3. Key in the correct data and continue to reverify the field.
4. Set the AUTO SK/DUP switch in the AUTO SK/DUP position.
5. Continue verifying the remaining data in the card.

BLANK COLUMN VERIFICATION

Blank columns can be verified without program control (PROG switch OFF), on a column-by-column basis by pressing the space bar or the SKIP key.

Blank columns can also be verified, under program control (PROG switch ON), by preparing and storing a program that defines the field(s) for blank column verification.

A program card is prepared by keying FIELD DEFINITION 12 punches into every column of the field except the first column. The first column must remain blank. It is used by the Data Recorder to identify the field as one for blank column verification. *See Chapter 3, Figure 3-3.*

Note: Do not use the Auto Skip program code 11-punch. If used, the Data Recorder will bypass the entire field without verifying the blank columns.

After the program has been stored, perform verification of the card under normal program control but use one of the following methods to verify blank column(s) or field(s).

1. Press the space bar to verify blank columns on a column-by-column basis.
2. Press the SKIP key to verify blank columns on a field basis.
3. Press the REL key to verify a field of blank columns in the remaining portion of the card (e.g. Columns 71-80).

The ERROR indicator will light when the Data Recorder detects a non-blank column when verifying with or without program control.

ZERO FILL/BLANK FILL

The ZERO FILL/BLANK FILL switch is used to control punching in the leftmost columns of a right adjusted field, i.e. When in the ZERO FILL position, the Data Recorder will automatically insert zero punches in the leftmost columns of a right adjusted field during PUNCH mode. When in the BLANK FILL position, the columns will not be punched. They will remain blank.

Note: If the switch is in the ZERO FILL position or BLANK FILL position during PUNCH mode, it must remain in the same position during VERIFY mode or an error condition will result.

The setting of the switch is described in Chapter 3, Key punching RIGHT ADJUST or -RA.

ERASE A WORD

When it is necessary to perform a *word erase*, hold the UPPER SHIFT key down and press the FLD ERASE key. This causes the last word stored in memory to be erased from the buffer and decreases the column indicator to the column of the first letter of the word erased.

READ A MASTER CARD

A READ key operation is performed to read the information contained in a Master card into the buffer memory. For example, in punching the sample job described in Chapter 3, the data to be automatically duplicated could have been punched into a Master card instead of keying the duplicate data into the first card of the job. The pre-punched data in the Master card is read and stored in memory by depressing the READ key. To prepare and load a Master card into duplicate memory, the following steps must be performed:

1. Place a blank card in the primary hopper.
2. Set the keyboard switches in the AUTO REL position; the PROG and AUTO SK/DUP OFF.
3. Set the mode switch to PUNCH.
4. Press the REL key.
5. Key the data into the field(s) programmed to duplicate.

6. Press the REL key. (The Master card is punched, printed and released to Stacker 1.)
7. Place the Master card in front of a supply of blank cards in the primary hopper.
8. Set the PROG, AUTO SK/DUP, and AUTO REL keyboard switches in the ON position.
9. Depress the READ key. (The Master card is read and released into stacker 2; a blank card is fed into the visible wait station.)
10. Commence the PUNCH operation, or set up for REPRODUCE or INTERPRET operation.

Note: Perform only steps 7 through 10 when using a previously prepared Master card.

CHECKING CARD REGISTRATION

The Decision Data 8808 Card Gauge should be used once each day to check the punching registration of the machine(s).

1. Continuously punch a test card with a 9-punch and a 12-punch for 80 columns.
2. Place the test card, face up (12 edge to the top), against the guides at the top and right hand end of the gauge.
3. If the edges of the punched holes are outside of the black areas, the supervisor should be advised.

When an off-punched card is detected during VERIFY, REPRODUCE, INTERPRET or INTERSPERSED GANGPUNCH operations, reference should be made to Chapter 6, READ CHECK Recovery Procedures.

5/REPRODUCE AND INTERPRET FUNCTIONS

INTRODUCTION

This chapter is a supplement to Chapter 3, which provides the details of the REPRODUCE and INTERPRET modes of operation. Reproducing cards can be accomplished by either the 8001 or the 8010; however, interpreting (i.e. printing of pre-punched data) is restricted to the 8010.

The simple procedures for reproducing and interpreting 80 column cards are provided in this chapter. In addition, operational variations are outlined which the operator may incorporate as required by the type of processing to be accomplished.

REPRODUCE

A simple reproduction of 80 column cards does not require a program. In addition, printing can be included by the 8010 by setting the PRINT switch to the PRINT setting.

1. Turn all keyboard switches OFF.
2. Set the MODE switch to REPRODUCE.
3. Load the primary hopper with the cards to be reproduced. (i.e. cards already punched).
4. Load the secondary hopper with blank cards.
5. Press the START switch.

Cards are alternately fed from the primary and secondary hoppers. Cards from the secondary hopper are punched (and printed) on a one-for-one basis with the data extracted from the primary hopper cards. Original cards from the primary hopper are released into stacker 1; duplicated cards are released into stacker 2.

INTERPRET (8010)

This function is used to print the data on the top of the cards which was previously punched into the cards. Characters are printed, column-for-column, according to the pre-punched data.

1. Set the MODE switch to INTERPRET.
2. Set the PRINT switch to PRINT.
3. Turn all keyboard switches OFF.
4. Load the primary hopper with the cards to be interpreted.
5. Press the START switch.

Cards will be fed continuously, printed, and released into stacker 1.

REPRODUCE AND INTERPRET (8010) UNDER PROGRAM CONTROL

The various functions of the program card and the mechanics of preparing it are provided in Chapter 3. The purpose of this paragraph is to describe the variations possible with both the 8001 and the 8010 when used under program control. The program control variations of PRINT

EDIT (8010), SKIP COLUMNS and PUNCH SUPPRESS can be selected for use in either the REPRODUCE or INTERPRET modes.

1. Prepare the program and load it into the appropriate program storage area. See Chapter 3.
2. Set the MODE switch to REPRODUCE or INTERPRET as appropriate.
3. Load the primary and/or secondary hoppers.
4. Press the START switch.

Cards will be fed continuously and will be processed under program control.

Note 1: If a PRINT EDIT program has been stored in memory, set the print switch to PRINT EDIT after performing Step 2. above.

Note 2: If a PUNCH SUPPRESS program has been stored in memory, move the PUNCH SUPPRESS toggle switch upwards to activate the PUNCH SUPPRESS program after performing Step 2 above. (This switch is spring-loaded and will return to the down position.)

REPRODUCE/GANG PUNCH

A field programmed for duplication can be used to replace unwanted data in a group of cards. For example, a group of cards has been punched with an incorrect date. The operator must prepare a *dup* program with the correct date and load it into memory for gang punching into the cards while the deck is being reproduced. Then, during the REPRODUCE/GANG PUNCH function, the deck of cards will be reproduced while the incorrect date is being replaced with the correct date. The steps to perform are as follows:

1. Prepare and load the program card. *See Figure 3-3.* (The program codes are the same as used for *Standard* programming and are punched only in those fields to be gang punched. e.g. Key a zero (0) punch in the first column of the field and key the remaining columns of the field with FIELD DEFINITION 12-punches).
2. Place two blank cards in the primary hopper.
3. Turn the AUTO SK/DUP and PROG keyboard switches OFF.
4. Set the AUTO REL keyboard switch in the AUTO REL position.
5. Set the MODE switch to PUNCH.
6. Press the REL key to feed a blank card.
7. Key the data into the field to be changed.
8. Press the REL key and punch the new data.
9. Set the MODE switch to REPRODUCE.
10. Remove the cards from the stackers.

11. Set the AUTO SK/DUP and program control switches in the AUTO SK/DUP and PROG positions.
12. Press the same program level key as used during PROG LOAD.
13. Place the cards to be reproduced into the primary hopper.
14. Place a supply of blank cards in the secondary hopper.
15. Press the START switch.

As cards are reproduced and gang punched, the original card file is released into stacker 1; the duplicate card file is released into stacker 2.

BLANK CARD INTERFILING

This paragraph describes the steps necessary to *interfile* a blank card behind each pre-punched card within a master deck of cards.

1. Prepare and load a full skip program. See Figure 3-3. (e.g. Key an 11-punch into column 1 and key the remain-

ing columns through 80 with FIELD DEFINITION 12 punches).

2. Set the keyboard switches to PROG, AUTO REL and AUTO SK/DUP.
3. Set the MODE switch to REPRODUCE.
4. Place the pre-punched cards into the primary hopper.
5. Place a supply of blank cards into the secondary hopper.
6. Hold the MULT PUNCH key down; press the START switch.

All cards will follow one another as fed from the primary and secondary hoppers and will interfile into stacker 1. When stacker 1 becomes full, the cards will continue to interfile into stacker 2.

Note: When cards are to be interfiled during a REPRODUCE variation, as previously discussed in this chapter, hold the MULT PUNCH key down and press the START switch as the last step of the operation.

6/ OPERATOR RECOVERY PROCEDURES

GENERAL

This chapter details the recovery procedures performed by the operator when an indicator lights on the operator panel during any mode of operation. If the Data Recorder does not become functional after performing the appropriate recovery procedure to correct an indicator condition, your Decision Data Service Representative will be happy to assist you.

Note: Some error conditions cause the Data Recorder to stop before completing a card cycle. Although the error condition may have been corrected, the Data Recorder could

still be in a locked up condition because the card cycle is not completed. As a general recovery procedure, perform a mode clear to clear the Data Recorder and reset the card cycle.

Figure 6-1 identifies those areas of the Data Recorder which are of importance to the operator when performing the recovery procedures.

Caution: When it is necessary to clear a card jam from within the card transport system, the front cover must be raised prior to lifting the top cover (described on the following pages) to avoid possible damage to internal machine parts.

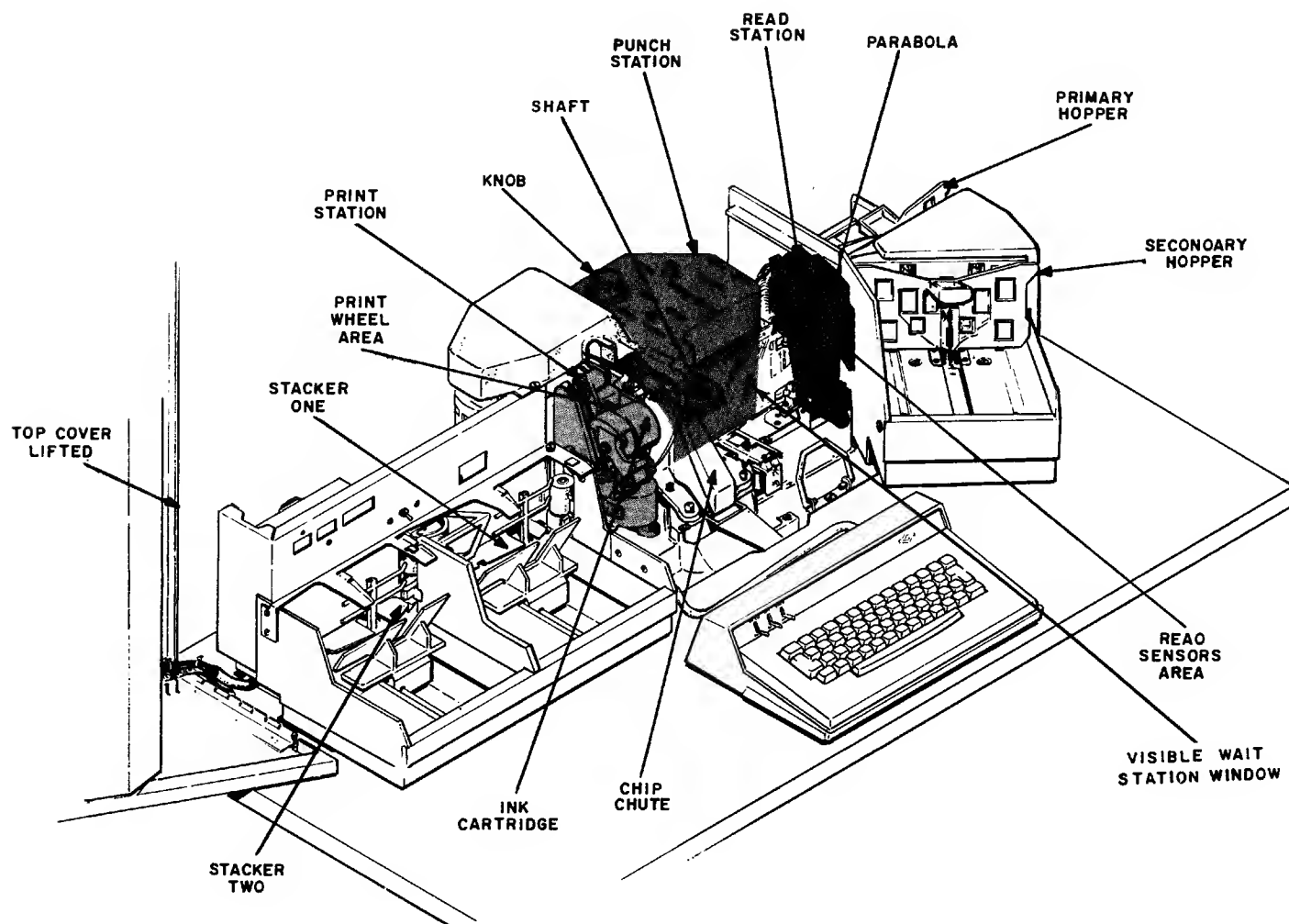


Figure 6.1. 8010 Interpreting Data Recorder (Top Cover Lifted)

INDICATOR CONDITION	CAUSE	MODE	RECOVERY
READ CHECK	Off-punched card detected during a card read operation. Use the card gauge 8808 to check off-punch condition or false error condition. Place the card, face up, 12 edge to the top, against the guides at the top and right hand end of the gauge. If the edges of the punched holes are outside of the black areas, the card must be re-keyed. If not, eliminate the re-key step written for the applicable mode of operation.	VERIFY	<ol style="list-style-type: none"> 1. Remove card from Stacker 2 2. Press STOP/RESET 3. Perform mode clear 4. Turn mode switch to PUNCH 5. Re-key card 6. Remove card from stacker 1 and place in front of card file in primary hopper 7. Turn mode switch to VERIFY 8. Press READ key
		REPRODUCE	<ol style="list-style-type: none"> 1. Remove card from stacker 1 2. Press STOP/RESET 3. Turn mode switch to PUNCH 4. Re-key card 5. Remove card from stacker 1 and place in front of card file in primary hopper 6. Turn mode switch to REPRODUCE 7. Press START switch
		INTERPRET	<ol style="list-style-type: none"> 1. Repeat steps 1-7 for REPRODUCE above except select INTERPRET mode in Step 6
		INTERSPERSED GANGPUNCHING	<ol style="list-style-type: none"> 1. Place Master/Detail switch to OFF position 2. Perform mode clear 3. Perform steps 1-5 REPRODUCE above 4. Turn mode switch to PUNCH 5. Place Master/Detail switch to Master or Detail position 6. Press REL key
HOPPER	Empty Hopper	PUNCH	<ol style="list-style-type: none"> 1. Press STOP/RESET 2. Reload the Hopper(s) 3. Perform mode clear 4. Press REL key
		VERIFY	<ol style="list-style-type: none"> 1. Press ERROR RESET 2. Reload the Hopper(s) 3. Perform mode clear 4. Press READ key
		REPRODUCE	<ol style="list-style-type: none"> 1. Press STOP/RESET 2. Reload the Hopper(s) 3. Press START switch
		INTERPRET	<ol style="list-style-type: none"> 1. Repeat as written for REPRODUCE-Empty Hopper
	Mis-Feed	PUNCH	<ol style="list-style-type: none"> 1. Remove mis-fed card and place in front of card file in primary hopper 2. Press ERROR RESET 3. Perform mode clear 4. Press REL key
		VERIFY	<ol style="list-style-type: none"> 1. Perform Steps 1-2 for PUNCH Mis-Feed 2. Perform mode clear 3. Press READ key

INDICATOR CONDITION	CAUSE	MODE	RECOVERY
HOPPER (Continued)		REPRODUCE	<ol style="list-style-type: none"> 1. Remove mis-fed card and place in front of card file in primary hopper 2. Press STOP/RESET 3. Press START switch
		INTERPRET	<ol style="list-style-type: none"> 1. Perform Steps 1-3 for REPRODUCE Mis-Feed
STACKER	Stacker Full	PUNCH VERIFY REPRODUCE INTERPRET	<ol style="list-style-type: none"> 1. Remove cards from stacker(s) 2. Press STOP/RESET 3. Press START switch for all modes to resume operation except VERIFY: Press READ key
FEED CHECK	Card Jam in Read Station <i>(See Figure 6-1)</i>	PUNCH VERIFY REPRODUCE INTERPRET	<ol style="list-style-type: none"> 1. Turn Power OFF 2. Raise front cover 3. Remove Parabola (Push straight down while pulling the top towards the front) 4. Gently pull cards free 5. Replace Parabola securely with clamp 6. Close cover 7. Turn Power ON 8. Press STOP/RESET 9. Turn mode switch to PUNCH 10. Re-make damaged card(s)
	Card Jam in Punch Station <i>(See Figure 6-1)</i> Note: The recovery procedure written includes the use of the Decision Data Card Removal Tool 9180 to assist in the removal of a card jam in the Punch Station. This tool has been specifically designed for use in the Punch Station and should not be used in any other area of the machine. The Card Removal Tool has a hook on one edge which can catch on mechanical parts in the bottom of the Punch Station. To prevent possible damage, excessive force should not be applied in this area. The Card Removal Tool should only be used if the jam cannot be cleared after performing steps 5 and 6. If the tool is then required, include steps 7-11 as part of the recovery procedure.	PUNCH VERIFY REPRODUCE INTERPRET	<ol style="list-style-type: none"> 1. Turn Power OFF 2. Raise front cover to open position 3. Raise top cover to vertical position (The hinge is at the left side; lift from right end from the front of machine) 4. Rotate the knob on the top of punch assembly until white mark is toward front of machine 5. Remove the visible wait station window 6. Rotate the shaft located to the right of the chip chute; the card should move into position to grasp for removable 7. Remove the Post Punch Read Station Parabola (if installed in machine) 8. Insert the Card Removal Tool into the Punch Station along this card path, and use a push-pull motion to remove the card piece(s) 9. Manually push a card through the Punch Station to ensure that all card pieces have been cleared 10. Replace the Visible Wait Station Window into position (Ensure that the window is flush against both top magnets and is held by both lower clamps) 11. Replace the parabola into position 12. Close top cover (Be sure it does not catch the wires by the Read Station) 13. Close front cover

INDICATOR CONDITION	CAUSE	MODE	RECOVERY
FEED CHECK <i>(continued)</i>			14. Turn Power ON 15. Press STOP/RESET 16. Set mode switch to PUNCH 17. Re-make damaged card(s)
	Card Jam in Print Station <i>(See Figure 6-1.)</i>	PUNCH VERIFY REPRODUCE INTERPRET	1. Turn Power OFF 2. Raise front cover 3. Pull card free (Severe Jam—Follow Steps written for Card Jam in Punch Station) 4. Close cover 5. Turn Power ON 6. Press STOP/RESET 7. Turn mode switch to PUNCH 8. Remake damaged card(s)
STACKER- FEED CHECK	Card Jam in Stacker Transport System <i>(See Figure 6-1.)</i>	PUNCH VERIFY REPRODUCE INTERPRET	1. Repeat Recovery Procedure written for FEED CHECK—Card Jam in PUNCH Station
PUNCH CHECK	1. Failure to pass the light/dark checks. A. Any of the photo transistors in the Post Punch check read station indicating a dark condition in between cards. B. Any of the photo transistors in the post punch read station indicating a light condition between the leading edge of the card and column 1. 2. A mis-compare of the column data read at the Post Punch read (information that was punched into the card) and punch-check memory (information from the system to be punched into the card plus information previously punched in the card & retrieved at the read station).	ON-LINE	Punch Check recovery in an on-line mode is a systems function and would be handled by the systems software. NOTE: Three cards are placed into stacker 2 for every punch check detected; the first card being the detected error card. The Data Recorder is clear of a card in the visible wait station.

INDICATOR CONDITION	CAUSE	MODE	RECOVERY
ERROR ERROR CHANGE CHANGE REVERIFY	Incorrect Source Document	PUNCH SELF-CHECKING	<ol style="list-style-type: none"> 1. Press ERROR RESET 2. Re-key the Self-Check Number 3. Press ERROR RESET 4. Press SKIP key and complete the record 5. The card will not receive the "OK" punch and the Self-Check Number field will be blank 6. Remove the card and source document for correction
	Alpha Character Keyed in Numeric Field	PUNCH	<ol style="list-style-type: none"> 1. Press ERROR RESET 2. Press numeric key and continue or, insert ALPHA character over NUMERIC character: Depress LOWER SHIFT, hold and key ALPHA character.
	Mis-Key of Data	VERIFY	<ol style="list-style-type: none"> 1. Press ERROR RESET 2. Key correct character and continue
	Incorrect Keyed Data		<ol style="list-style-type: none"> 1. Press ERROR RESET 2. Key correct character 3. Press ERROR RESET 4. Key correct character again 5. Key balance of field 6. Reverify
ALL LIGHTS OUT	Power OFF/ON	All Modes	<ol style="list-style-type: none"> 1. Check ON/OFF switch 2. If ON, press the circuit breaker located to the left of the power switch 3. Power OFF, turn ON 4. Check plug for insertion into wall outlet 5. If none of the above, turn the Data Recorder power switch to OFF and request service.

SELF-CHECKING NUMBERS

General Description

Transposition of digits within a number is a common key entry error. The Self-Checking features permit detection of most such mistakes before the card is punched. Certain kinds of numbers lend themselves to self-checking. Account numbers and part numbers are two examples of numbers that can be made self-checking. At the time the number is created, the originator assigns a single-digit number to the basic number; the single-digit number is called the check digit and becomes the units (low order) position of the self-checking number. The originator, or possibly a computer, determines the check-digit by using a formulae to calculate the basic number. Mod 10 Self-Checking Number (Feature 1023) and Mod 11 Self-Checking Number (Feature 1024) have different formulae as described in the paragraph, Calculating the Check Digit.

Punching Self-Checking Numbers

A field containing self-checking numbers is programmed with a 3-punch in the first column of that field in the program control card. The self-checking feature is active only in the PUNCH mode. When a card containing self-checking numbers has been correctly keyed, it will receive an *OK punch*. The *OK punch* is an 11-punch in column 81. See Figure 7-1. If a number does not pass the self-checking test, (the last digit of the number keyed does not match the check digit that the machine has calculated), the ERROR indicator lights and the keyboard locks.

1. Press the **ERROR RESET** key. (The **ERROR** indicator turns off, the column indicator displays the first column of the self-checking field and the keyboard unlocks).

2. Re-key the number. (If the ERROR condition is a result of a mis-key from the operator, the record can be completed normally and the card will receive the OK punch).
3. If the ERROR indicator lights again and the operator is satisfied that no keying errors were made, it can be assumed that the number written on the source document is incorrect.
4. Press ERROR RESET.
5. Press the SKIP key and complete the record.
6. The card will not receive the OK punch and the field that would have contained the self-checking number will be blank.
7. Separate the card and its source document from the rest of the work so they can be corrected.

Verifying Self-Checking Numbers

A 3-punch used in PUNCH mode to identify a Self-Checking Number field is also used in VERIFY mode to identify right adjusted fields. Therefore, the same program control cannot be used in VERIFY mode unless the Self-Checking Number field has been right adjusted during PUNCH mode.

If the Self-Checking Number field has not been right adjusted, a new program control card is prepared for VERIFY mode using the same punch codes as used in PUNCH mode with the exception of the field containing the Self-Checking Number. Code the Self-Checking Number field with FIELD DEFINITION 12-punches in every column except the first. The first column remains blank.

Calculating The Check-Digit

The data recorder calculates the check-digit, but it does not punch the result of the calculation; that is, the data recorder

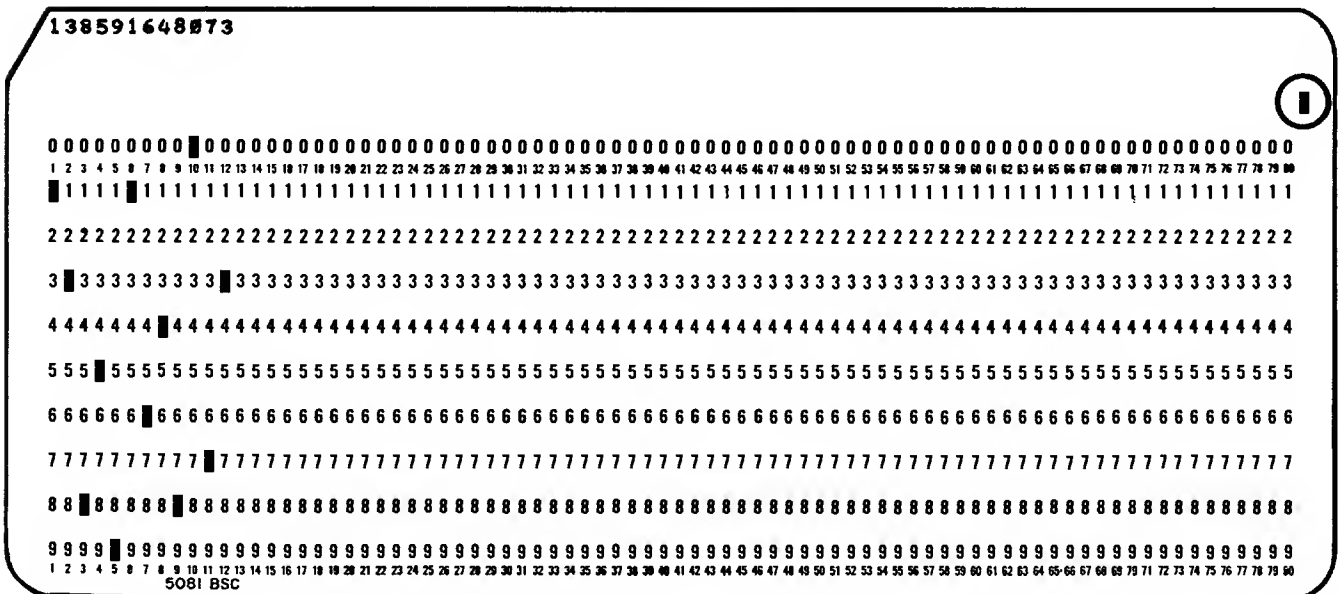


Figure 7.1. Self-Checking OK Punch

is used only to check the accuracy of the number and not to originate it. The following examples of check-digit calculations are provided only as background information.

MOD 10 CHECK-DIGIT—Assume a basic number of 042206017 is to be assigned as a charge account number. The check-digit is found as follows:

1. Beginning with the first (low-order) position of the basic number, multiply it and every odd position by 2.

$$\begin{array}{r} 0 \quad 4 \quad 2 \quad 2 \quad 0 \quad 6 \quad 0 \quad 1 \quad 7 \\ \times 2 \quad \times 2 \quad \times 2 \quad \times 2 \quad \times 2 \\ \hline 0 \quad 4 \quad 0 \quad 0 \quad 14(5) \end{array}$$

If a product is greater than 9, add the two digits together to arrive at a single-digit answer. In the example, $7 \times 2 = 14$; add 1 and 4 to give a result of 5.

2. Multiply the even positions of the basic number by 1.

$$\begin{array}{r} 0 \quad 4 \quad 2 \quad 2 \quad 0 \quad 6 \quad 0 \quad 1 \quad 7 \\ \times 1 \quad \times 1 \quad \times 1 \quad \times 1 \\ \hline 4 \quad 2 \quad 6 \quad 1 \end{array}$$

3. Add the products of step (1) and step (2) together. $0+4+0+0+5(\text{step 1})+4+2+6+1=22$
4. Divide the sum by 10; find the remainder. $22 \div 10 = 2$ with a remainder of 2.
5. Subtract the remainder from 10. $10 - 2 = 8$. This is the check-digit and becomes the units position of the self-checking number.
6. The self-checking number is 0422060178.

MOD 11 CHECK-DIGIT

1. Beginning with the low-order position of the basic number, multiply each position by its weighting factor. The factor for the units position is 2, the tens position is 3, the hundreds position factor is 4, the next position 5, etc. If there are more than six positions to the basic number, repeat the weighting factor sequence. That is start with X2, X3, X4, X5, X6, X7, and repeat, X2, X3... as necessary. Assume the example of a basic number of 13859164807.

$$\begin{array}{r} 1 \quad 3 \quad 8 \quad 5 \quad 9 \quad 1 \quad 6 \quad 4 \quad 8 \quad 0 \quad 7 \\ \times 6 \quad \times 5 \quad \times 4 \quad \times 3 \quad \times 2 \quad \times 7 \quad \times 6 \quad \times 5 \quad \times 4 \quad \times 3 \quad \times 2 \\ \hline 6 \quad 15 \quad 32 \quad 15 \quad 18 \quad 7 \quad 36 \quad 20 \quad 32 \quad 0 \quad 14 \end{array}$$

2. Add the products. $6+15+32+15+18+7+36+20+32+0+14=195$
3. Divide the sum by 11, and find the remainder. $195 \div 11 = 17$ with a remainder of 8.
4. Subtract the remainder from 11 to find the check digit. $11 - 8 = 3$ a check-digit value of 3.
5. The self-checking number is 138591648073.

Since the mathematics used to find Mod 11 check-digits are more complex than for Mod 10 check-digits, it can be correctly assumed that the Mod 11 Self-Checking Number

feature will detect more errors. However, Mod 11 calculations can result in a check-digit of two positions; which means there are some combinations, hence some numbers, that cannot be used as Mod 11 self-checking numbers.

PRODUCTION STATISTICS (Feature 1025)

The Production Statistics feature consists of three counters mounted in the top cover just over the left-most stacker. These are six-position counters; only one of which is resettable by the operator. See Figure 7.2.

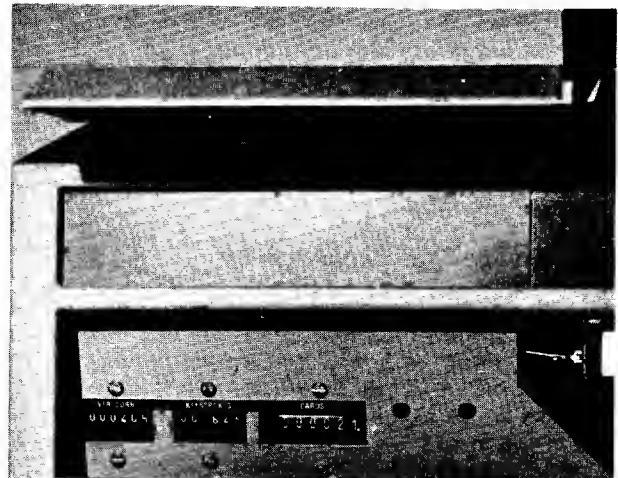


Figure 7.2. Production Statistics Counters

Card Counter

This counter is reset by pressing the red RESET button. It counts as follows:

1. Each card punched in the PUNCH mode.
2. Each card verified in the VERIFY mode (not error cards).
3. Each card printed in the INTERPRET mode.
4. Each card created in the REPRODUCE mode (not original cards).

Keystroke Counter

The keystroke counter is not resettable. It counts once for every ten keystrokes in the PUNCH or VERIFY modes.

Verify Correct Keystroke Counter

This counter counts each verify corrected keystroke. In other words, it counts each error in cards being verified.

INTERSPERSED GANGPUNCHING (Feature 1022)

The Interspersed Gangpunch feature is basically a device that automatically selects program level 1 or program level 2 under control of a switch and the upper left corner cut of a card. It is a Master/Detail operation. This feature is activated by a three position switch on the operator panel. It is moved from the OFF setting to the position indicating which type of card, MASTER or DETAIL, has the upper left corner cut.

When a *Master* card fed from the input hopper is detected at the read station, the circuitry causes that card to be read into the buffer storage memory and the Data Recorder automatically selects program level two. When a *Detail* card is detected, the buffer storage retains its existing card image and the Data Recorder automatically selects program level one. There are three modes of operation: PUNCH, VERIFY and INTERPRET.

Punch

One typical use of this feature would be to duplicate several detail cards from one Master card. This duplication is called Gangpunching. Assume a program control card has been prepared and stored for the PUNCH mode:

1. Load a full duplicate program into PROG 1. *See Chapter 3, Figure 3.3.*
2. Load a full skip program into PROG 2. *See Chapter 3, Figure 3.3.*
3. Place a master card in front of the required number of blank cards in the primary hopper.
4. Turn the MASTER/DETAIL switch to the position identifying which card, master or detail, has the corner cut.
5. Set the keyboard switches in the PROG, AUTO REL and AUTOSK/DUP positions.
6. Press the REL key.

The master card is read and released into stacker 2; detail cards are fed and released into stacker 1. To merge all cards into stacker 1 (with overflow into stacker 2), hold the MULT PUNCH key down and press the START switch.

Note 1: Programming skip fields in program 2 and the associated program 1, fields with dup control will reproduce the master fields into the detail fields resulting in the normal Master/Detail relationship.

Note 2: Programming dup fields in program 2 and the associated program 1, fields with dup control will insert constant information (stored in the dup memory prior to starting the interspersed operation) into all detail cards in the file.

Example: An Interspersed Master/Detail file can be run to produce the desired detail cards with the added capability of inserting an updated item, (a date, FICA increase, etc.) which applies to the entire file, into all the detail cards.

Verify

Interspersed VERIFY mode operates similar to Interspersed PUNCH mode using the same program cards. All information punched into the master and detail cards will be verified. Fields duplicated into cards will be automatically verified; fields keyed into the cards will be manually verified; and fields skipped on the cards will be bypassed.

1. Place the pre-punched cards into the primary hopper.
2. Place a supply of blank cards into the secondary hopper.
3. Turn the mode switch to VERIFY.
4. Turn the MASTER/DETAIL switch to Master or Detail.
5. Set the auto release and program control switches in the AUTO REL and PROG positions; the AUTO SK/DUP OFF.
6. Press the READ key.
7. Key the data fields.

8. Set the AUTO SK/DUP keyboard switch in the AUTO SK/DUP position.

The original card file will be placed into stacker 1 and the error cards will be placed into stacker 2.

Interpret

Interspersed INTERPRET is similar to Interspersed PUNCH mode except there is no key-in cycle.

All cards come from the primary hopper (unless a hopper reverse is performed). All master cards are read into the memory without program control. *See Notes 1 and 2 in PUNCH mode above.*

Program area 2 is used to control the transfer of data from the buffer memory to the print memory and to the dup memory for master cards. When the buffer memory is transferred to the print memory, the skip and dup fields of program area 2 will prevent transfer and will erase those columns in the print memory. When the buffer memory is transferred to the dup memory, the dup fields of program area 2 will prevent transfer and the dup memory data will be retained in those columns.

Program area 1 is used to control the reading of detail cards. During reading, columns with a skip or dup field in program area 1 will not be read into the input memory. A skip field will place a blank in the buffer memory; a dup field will transfer a character from the dup memory into the buffer memory. The transfer of data from the buffer memory to the print memory and dup memory for detail cards is not affected by the program.

Interpret mode always operates in a stacker overflow manner.

INTERFACE (Feature 1026)

A computer peripheral interface is available for the 8001 and 8010 as an optional feature. An ON-LINE switch is provided on the operator's panel to allow the unit to operate off-line as a normal Data Recorder. A green READY indicator is added to the operator's panel. *See Chapter 2 for a description of the ON-LINE switch and the READY indicator.*

The Interface is activated by pushing the ON-LINE switch up to the ON-LINE position and pressing the START switch. The READY indicator lights.

PUNCH CHECK (Feature 1027)

The post punch read punch check optional feature provides a post punch read station and checking circuits to verify the entire punched image of the card. The Interface optional feature must be installed as a pre-requisite to this feature. Only cards generated while ON-LINE are checked by this feature. A red PUNCH CHECK indicator is also added to the operator's panel as part of this feature.

EIGHT PROGRAM LEVELS (Feature 1042)

This optional feature provides four additional program levels. These additional program levels are selected by the Home Program Select switch or by holding the LOWER

SHIFT key down while depressing one of the keyboard program level keys.

LOWER SHIFT and PROG 1 selects program level 5; indicators 1 & 4 display

LOWER SHIFT and PROG 2 selects program level 6; indicators 2 & 4 display

LOWER SHIFT and PROG 3 selects program level 7; indicators 3 & 4 display

LOWER SHIFT and PROG 4 selects program level 8; indicators 1, 3 & 4 display

TEN KEY REVERSE NUMERIC KEYBOARD (1063)

This feature provides the user with a keyboard with the numerics reversed to be compatible with the keyboard arrangement for standard calculators. Figure 7.3 illustrates the reverse numeric keyboard arrangement.

Using the reverse keyboard, one depression of the space bar will create a zero punch in UPPER SHIFT or a space in LOWER SHIFT. When it is necessary to create a space in UPPER SHIFT, the space key located in the top row of the keyboard must be depressed.

Note: Depression of the MULT PUNCH key forces UPPER SHIFT. Release of the MULT PUNCH key or depression of the space bar advances the column count. With this feature installed, release of the MULT PUNCH key or depression of the space key advances the column count.

51 COLUMN CARDS (Feature 1048)

This optional feature provides the user with an accessible adjustment to the card transport mechanism to set the 8001/8010 to process either 80 column cards or 51 column cards.

When the Data Recorder is set to process 51 column cards, verify holes (and self-check OK punching) occurs in column 52. Programs are loaded for 51 columns and all cards processed are released into stacker 1. The Data Recorder operator procedures are the same as written for the 80 column card, but working with 51 columns of data.

Backspacing from column "00" cannot be accomplished. Operator recovery should be to depress "HOME" key and re-key the card.

Note: The hoppers should be loaded to only 3/4 capacity when using 51 column cards; 450 cards in the primary hopper and 300 cards in the secondary hopper.

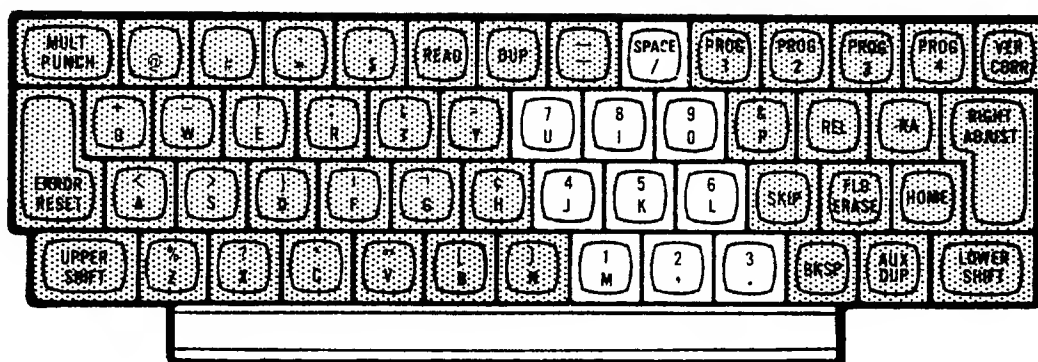


Figure 7.3. 10 Key Reverse Numeric Keyboard

8/ OPERATOR MAINTENANCE

CLEANING THE DATA RECORDER

The operator should clean the machine occasionally to ensure reliable performance. Figure 8.1 illustrates the Data Recorder mechanical parts with the top cover lifted. However, the front cover must be raised prior to lifting the top cover of the Data Recorder to avoid possible damage to internal machine parts.

Card dust, when allowed to accumulate, can result in READ CHECKS and other malfunctions. Use a vacuum cleaner to draw card dust out of the machine; a small brush is also suitable for cleaning. Do not use a vacuum cleaner to *blow out* the machine as chips in the punch unit may cause mis-punching.

Hopper Card Detectors

The Hopper Card Detectors (sensors) are located in a crevice area below the primary and secondary hopper rollers.

The Card Detector areas should be cleaned occasionally with a piece of high pile felt to avoid a **HOPPER indicator error light** that can result from card dust pile up on the hopper sensors.

Read Station

Clean the parabola and read sensors occasionally with a lint free cloth and Isopropyl Alcohol to avoid *Read Checks* or *Error Lights* that can result from a dirty read station.

Print Wheel

Poor printing can result if the character points become clogged. Wipe the print wheel with a lint free cloth dampened with Isopropyl Alcohol to clean it.

CAUTION: AVOID SPILLING COFFEE OR OTHER BEVERAGES ON THE MACHINE. DO NOT ALLOW PAPER CLIPS, ETC., TO FALL INTO THE MACHINE.

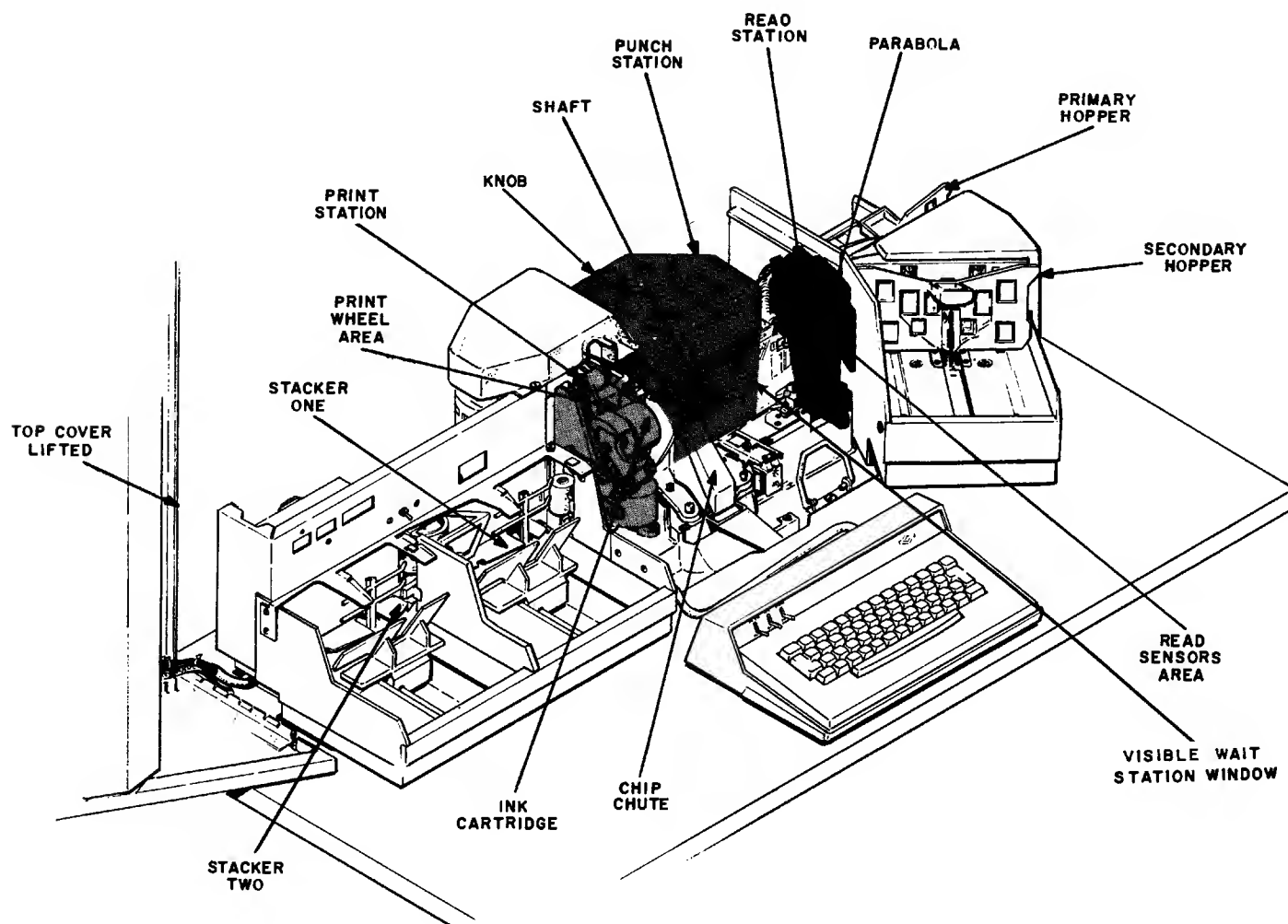


Figure 8.1. 8010 Interpreting Data Recorder (Top Cover Lifted)

INK CARTRIDGE REPLACEMENT

The operator should replace the ink cartridge when print quality deteriorates due to depletion of ink in the ink cartridge. The procedure for removing and replacing the ink

cartridge is simple and minimizes the likelihood of getting ink on the operator's fingers.

Figure 8.2 illustrates reference terms for each step to be performed.

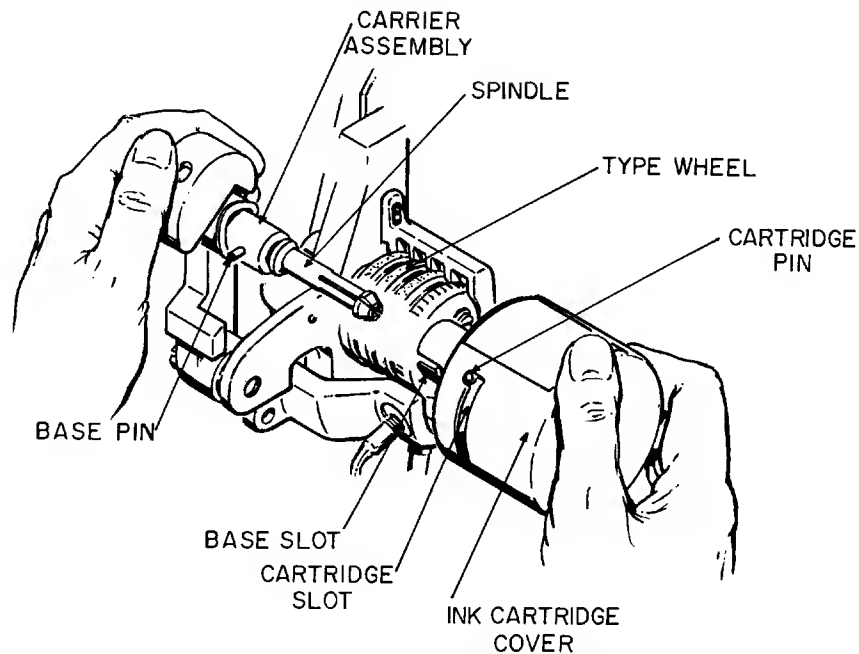


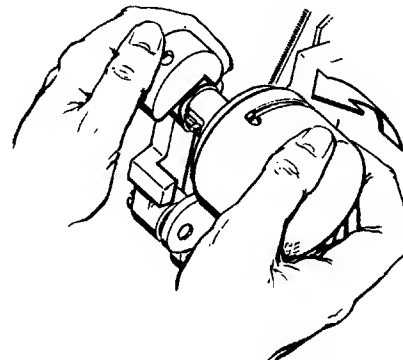
Figure 8.2. Ink Cartridge and Carrier Assembly

Ink Cartridge Removal

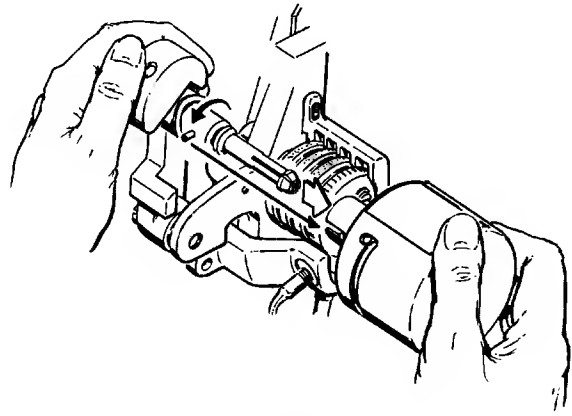
- a) Raise the front cover to open position. Pivot the ink roll and carrier assembly away from the type wheel by pulling the assembly towards you.



- b) Holding the carrier assembly, pull the ink cartridge to the right to put the cartridge pin in the opening of the cartridge slot.

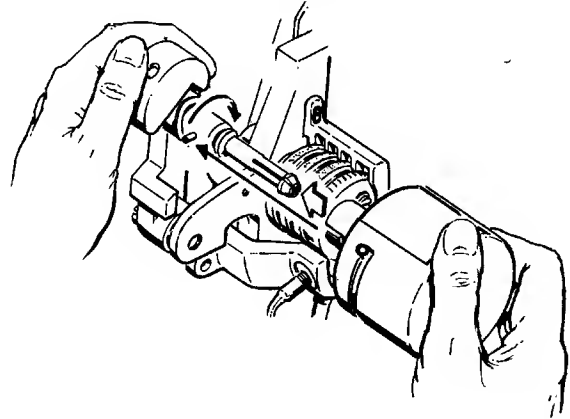


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- c) Rotate the ink cartridge counterclockwise until the cap is closed (ink cartridge covered). The cartridge pin will move to the end of the cartridge slot and the base pin will free itself from the base slot. Pull the ink cartridge horizontally off the spindle.

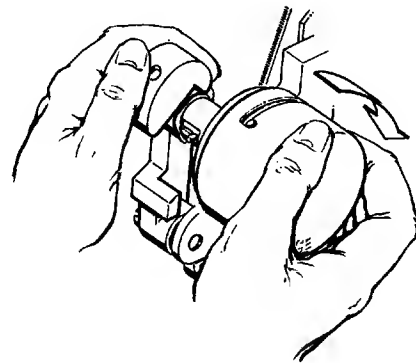


Ink Cartridge Insertion

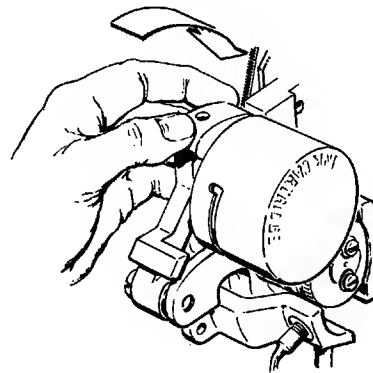
- a) With the carrier assembly pulled away from the type wheel, place the ink cartridge onto the spindle by lining up the base slot with the base pin. Maintain pressure to allow the base pin to enter the opening of the base slot.



- b) Turn the ink cartridge cover clockwise until the cartridge pin enters the notch at the end of the cartridge slot. Maintain pressure to the ink cartridge and continue to turn clockwise until the base pin moves down into the base slot.



- c) Engage the ink cartridge with the type wheel by pivoting the carrier assembly towards the back of the machine until the ink cartridge contacts the type wheel. Close the front cover.



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